COMPUTERWORLD

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Wang's image shines in the current market for imaging systems, but the threat of IBM looms ever closer. Page 4.

The Presentation Manager battling against the tide as users evaluate costs of implementation and limitations of the initial version. Page 156.

Cullinet shaken up again as former M&D whiz Robert Weiler moves into the president's office. Page 127.

Virus ravages thousands of systems

BY MICHAEL ALEXANDER
CW STAFF

System managers scrambled madly last week to assess the damage done when a computer virus planted in a nationwide network brought thousands of computer systems to their knees.

The program, a type of virus commonly referred to as a worm because of its ability to slip into computer systems and propagate itself, was discovered Wednesday on computers linked to the Internet network. Internet ties several networks throughout the nation and is predominantly used by universities, research laboratories, federal agencies and other institutions. Estimates of the number of systems affected ranged from 6,000 to 250,000.

As the worm turns

A renegade program invaded computer networks last week, locking up systems all over the country

1. A worm program designed to find unused resources on a network
2. Program enters Internet, a networking service linking multiple networks, including Arpanet
3. Program invades Sun Microsystems Sun-3 and DEC Microvax systems running Unix versions
4. Program attaches to communications module of operating system and replicates itself, dominating CPU resources; it is passed to other systems on the network where it duplicates the process

CW CHART: FRANK C. O'CONNELL

It may be several weeks before the virus is entirely purged from all the computers on the system — particularly computers operated at remote sites and locations, where users are not equipped to trap the virus. But several organizations said they were successful in containing the problem and in instituting fixes for affected operating systems.

As the program replicates itself, it ties up computers, eventually bogging them down, said Stephen Hall, director of the office for information technology

Inside

Damage assessment, business reaction and other coverage. Page 157.

at Harvard University, where Sun Microsystems, Inc. workstations took the brunt of the assault. While malicious, the virus apparently does not damage or destroy files but is simply a pain in the neck, Hall said.

The most severe impact known as of late Friday was at

the National Aeronautic and Space Administration's Ames Research Center in Mountain View, Calif. According to a spokesman, the systems had not been brought back into service as of mid-Friday; the number of systems impacted was not available.

According to Chuck Cole, computer security manager at Lawrence Livermore Laboratories in California, "The worm affected the system parameters for how many users can be active. Those tables are finite and linked. The tables were filling up so no other active users could use the system."

James D. Bruce, a professor and vice-president for information systems at MIT, said the virus showed up in the university's Digital Equipment Corp. VAX systems early Wednesday and spread to 200 of the approximately 2,000 computers in use at the Cambridge., Mass., institution.

Federal agencies are expected to conduct their own internal investigations to see whether any harm was done, according to Richard Adams, spokesman for the U.S. Secret Service in Wash-

Surge to IBM bus stalling clone option?

BY WILLIAM BRANDEL
CW STAFF

After more than a year of derision, IBM's Micro Channel Architecture appears to be gaining strength as a market standard. But clone vendors that have banded behind a proposed alternative declared last week that they have no intention of providing what users now seem to be demanding.
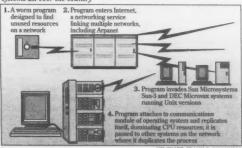
Vendors supporting the Extended Industry Standard Architecture indicated last week that they will stick with the alternative they announced in September.

Momentum for the MCA seems to be surging. International Technology Group's Clare Fleig estimated that 2.6 million MCA machines will be in-

COMPUTERS AND POLITICS

High-tech a campaign also-ran

BY JAMES DALY
and NELL MARGOLIS
CW STAFF

It's almost over. Nearly two years after the first candidate threw his fedora into the ring, the American public will file to the polls tomorrow, collectively cast its vote and turn Election '88 into a memory.

As the remaining weeks turned into days and the days now dwindle into hours, computers remain everywhere in the election process — except at the core.

Like any other large-scale business, electing a president rests on an underpinning of automated offices. Campaign-critical tasks such as tracking financial contributions, identi-

JULIA TALCOTT

fying voters and targeting them with specific pitches and, ultimately, tallying the vote rely heavily on computers.

But when it comes to addressing issues, projecting a nice-guy image and the 11th-hour necessity of getting out the vote, the use of computers finishes far behind old-fashioned, flag-waving, baby-kiss-

ing American politicking. The Fortune 500 may be waist-deep in the information age, but in this election year, most campaigns boast less technological sophistication than a nearby department store.

"Computers haven't radically altered political campaigning," said Bob Blaemire,

IN THIS ISSUE

Junior makes five. The newest member of the Cray-2 family provides 30% more throughput than its older siblings — for only $17 million. Page 10.

Some to grow on. Tandem unveils four expansive Nonstop VLX high-end configurations with four to 32 processors as well as two entry-level units. Page 18.

Quotable

"I t's OK to say the U— word."

Buttons worn by Unix Expo attendees. See story page 8.

Apple is now seriously considering the RISC

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. is evaluating reduced instruction set computing (RISC) microprocessors and is investigating the possibility of designing its own RISC chip, a company official said last week.

Charles Oppenheimer, manager of Apple's Macintosh product line, acknowledged "several research efforts" regarding RISC. However, Oppenheimer declined to specify when a RISC-based Mac will be introduced.

"We're evaluating all the major vendors of RISC," Oppenheimer said. "Would Apple consider designing a RISC chip of its own? Yes."

RISC is commonly considered to offer better overall systems performance more economically than do complex instruction set computers and is ideal for performance-intensive applications.

Although Apple is interested in RISC, it remains committed to Motorola, Inc.'s 68000 line of microprocessors, Oppenheimer maintained. "You've seen a 68030 from us, and you'll see a 68040," he said. "The promise of RISC is always better performance. But I don't think you can say that RISC is a requirement for any specific applications."

Industry watchers said Motorola stands the best chance to supply Apple with RISC, based on the firms' long vendor-supplier relationship. Motorola officials confirmed that Apple is evaluating its 88000 RISC microprocessor, introduced in April and scheduled to ship during the first quarter of next year.

Landing Apple as a customer would be an important boost to Motorola's RISC program. Sun Microsystems, Inc., another major customer of Motorola's 68000 products, has developed its own RISC microprocessor, called Scalable Processor Architecture, or Sparc.

Bridgework bustle

The pressure's on to connect Macs to IBM hosts

BY PATRICIA KEEFE
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. is making up for lost time in building bridges between its Macintosh computers and IBM hosts. The goal is to position the Mac as a terminal on an IBM network.

"One of the great lies is that you're bringing in a computer for stand-alone applications," said John McCarthy, director of research at Forrester Research, Inc. in Cambridge, Mass. "Apple is getting beaten up badly" in its large accounts. As these users mature, they want to link their Macs to the host, he added.

Last week, at the Macintosh Business Users Conference in Anaheim, Calif., Apple fired off an initial response.

Digital Communications Associates, Inc. announced Macirma TLPM, which it claimed will enable Mac II and SE users to graphically display mainframe applications written to Apple's Macworkstation in an IBM 3270 environment.

Key concept
"This concept is of paramount importance in major corporations," said Randy Battat, Apple's vice-president of product marketing.

Apple said it will bundle that software with Macworkstation, which enables users and developers to add a graphical interface to host applications such as IBM's VM Notes.

"We view 3270 communications as strategic, and this announcement is a key part of our efforts to gain a greater presence in that environment," Battat said.

Other developments that are expected to snowball in the next few weeks include the following:
● Avatar Technologies, Inc., a supplier of micro-to-mainframe links, is said to be developing a similar driver for its Macmainframe Mac-to-IBM host connectivity family. It reportedly will also be bundled with Macworkstation.
● Ideassociates, Inc another maker of IBM terminal emulation and gateway products, is expected to announce a similar bundling arrangement tomorrow at a Comdex/Fall '88 press conference.
● Apple has said it will unveil its token-ring card this month, with deliveries slated for the first half of 1989.

Apple is "moving hard" into host connectivity, said Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. He cited as evidence Apple's recent purchase of Systems Network Architecture developer Orion Network Systems, Inc. and the appointment of former IBM executive Don Casey as vice-president of networking and communications.

Right on time, sort of

IBM's image system plans are right on schedule — almost.

The company will likely put off plans for a second System/36-based image system installation, which had been scheduled for this quarter, according to Dave Liddell, manager of marketing plans for image application systems at IBM. But IBM is sticking to its goal of announcing general availability for its image systems in the first quarter of 1989, and the first MVS/ESA-based pilot project is still scheduled for mid-1989.

According to Liddell, the two current pilot projects, an MVS installation and System/36 project, are on track. The MVS project is taking place at the United Services Automobile Association insurance company in San Antonio, and the System/36 project is under way at Citibank NA. Plans for the third image platform, the IBM Personal System/2, will be provided sometime in 1989, Liddell said. The second System/36 project may be passed over in favor of an IBM Application System/400-based project, tentatively planned for next year's first quarter, Liddell said. With the AS/400 catching on quickly, it would make more sense to get a pilot project under way on that platform than go with another System/36 project, he said.

This schedule has caught the attention of competitors and users alike, all of whom are waiting to see what IBM comes up with for the relatively new image system market.

The schedule is also built on very ambitious plans for IBM to eventually roll out image systems on all three Systems Application Architecture platforms. IBM's plans are so ambitious that some analysts are beginning to doubt that it can achieve all this in the time frame it has sketched. Analysts said they expect IBM to announce early next year that it will begin general shipments in either the first quarter of 1989 or early 1990.

IBM's Liddell points to the progress at the pilot sites as proof that the company will meet its goals.

ROSEMARY HAMILTON

Pen, tablet, phone mean ease of use on Freestyle

BY ROBERT MORAN
CW STAFF

NEW YORK — Freestyle, Wang Laboratories, Inc.'s combination of electronic pencil, tablet and telephone handset, may refresh the frequently over-touted ease-of-use feature, analysts and users said following last week's announcement.

By touching a symbol such as a stapler or wastebasket icon with an electronic pen, users of Freestyle-equipped IBM Personal Computer AT compatibles can open files and then annotate documents in handwriting and voice, combine them, ship them to other users or leave them in electronic file baskets.

However, the first release is not fully integrated with the Wang Integrated Image System (WIIS) or its Office products. Freestyle only permits users to move information out of a file, annotate it and put it back, said Robert Cameron, vice-president of Dataquest, Inc. in Boxboro, Mass. "It needs both an interface to the entire windows structure in WIIS and the ability to navigate through it," he said.

That shortcoming will be eliminated in the next release of

the product, said Harry Bolan, technical projects manager at Westinghouse Trading Co. in Pittsburgh, Pa., which is a Freestyle beta-test site.

In the meantime, Wang has introduced what analysts have described as a teaser. Bart Stuck, vice-president at Probe Research, a Morristown, N.J.-based consultancy, claimed that Wang must lower its entry-level price from its current $1,995 to below the "magic thousand-dollar nut." With all the add-ons, Cameron claimed the average cost per seat comes to about $3,500. "That's too much," he said. "But Wang is trying to create market value and is discounting the hell out of it."

The tool did give Wang the decisive edge over Hewlett-Packard Co. in a $2.7 million contract with Hector & Davis, a large law firm with headquarters in Miami. According to Patricia Cash, the firm's MIS director, Freestyle is much easier to use than HP's New Wave, which was introduced in May but is not scheduled to be available until next March.

Analysts also anticipate local-area network support in the next release.

Cloud over Wang?

IBM could steal show in imaging systems

BY ROSEMARY HAMILTON
CW STAFF

In the pre-IBM image systems market, Wang Laboratories, Inc. is having a field day.

In one year's time, the Lowell, Mass.-based company has gone from zero to 120 in number of units sold, and users of its Wang Integrated Image System (WIIS) give the company high marks.

But new business will not come so easily in another year's time, when IBM is expected to begin image system shipments, consultants said last week.

Consultants noted that Wang has handled itself well with such competitors as Plexus Computers, Inc. and Filenet Corp., both smaller companies that entered the market ahead of Wang. But IBM will bring a new level of competition, especially for those accounts with long-standing IBM commitments.

The image systems market began to take off last year when traditional companies such as Wang tossed their hats into the ring, according to Steve Elliott, a partner at Arthur Andersen & Co.'s Andersen Consulting division in St. Louis.

According to International Data Corp. estimates, total market revenue jumped from $46 million in 1986 to $93.4 million in 1987.

From weeks to seconds
At the headquarters of the American Red Cross in Washington, D.C., a Wang image system was recently installed. Approximately 200,000 images in a refugee tracking system have been entered via a scanner. The images consist of photos, birth certificates, fingerprint representations and handwritten letters.

According to Bill Lupinacci, director of Red Cross headquarters systems and telecommunications, the search for refugee documentation could take as long as six weeks because it in-

volves looking through millions of 3- by 5-in. index cards in the basement of headquarters. Now a search on WIIS can take seconds, he said.

Many large IBM shops, however, will be reluctant to set up such applications without an IBM image system, Elliott said. "There's no question IBM will shake up this market," he said. "Whatever opportunities Wang had with larger, mainstream companies will be shut off."

Wang officials claimed last week that the firm recently made a few scores in traditional IBM accounts, but they would not identify those accounts.

Consultants said that even though the traditional large IBM accounts could be the most lucrative contracts, Wang can also look to other sources, including its own installed base and non-IBM accounts, to get new business. WIIS users from both of those segments contacted last week said they were very satisfied with the Wang product.

Pleased users
Washington, D.C., law firm Howrey & Simon, a longtime Wang user, installed WIIS earlier this year. The system, which currently stores 50,000 documents relating to a single antitrust case, supports seven lawyers and their assistants.
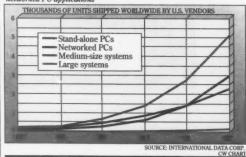
With WIIS, the lawyer types in the keywords to search for a set of documents and presses one key for the first image to appear on screen.

The American Automobile Association (AAA) just selected Wang after reviewing six vendors. Its WIIS system, now being installed, is intended to manage all documentation on AAA's inspections of hotels, campgrounds and restaurants.

Users said one reason for selecting Wang was that its system is available now. "Our need was immediate," said Helen Kelly, director of computer resources at Howrey & Simon.

What you're going to see
Electronic document systems integrating imaging technology and other features are projected to see greatest growth in stand-alone and networked PC applications

THOUSANDS OF UNITS SHIPPED WORLDWIDE BY U.S. VENDORS

- Stand-alone PCs
- Networked PCs
- Medium-size systems
- Large systems

SOURCE: INTERNATIONAL DATA CORP.
CW CHART

Autofact focus: Workstations

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Traditionally a showcase for mixed-vendor connectivity through the Manufacturing Automation Protocol and Technical and Office Protocol, Autofact served as a showcase for new levels of price/performance in workstation hardware here last week.

Even Apple Computer, Inc. got into the act, with Chief Executive Officer John Sculley promoting the concept of Macintoshes as data collectors on the factory floor.

"We have 200,000 Macintoshes in technical markets. It's the fastest growing market we have in the world," Sculley said in his keynote address. Apple uses Macs and Tandem Computers, Inc. processors to run its own factories, he said.

The synergy between computer-integrated manufacturing and wide-area networking was underlined by Sculley and by Digital Equipment Corp. President

Ken Olsen, who also gave a keynote address. "Information flow is often the most expensive part of the manufacturing organization," Olsen said.

Olsen described DEC's leverage of its internal 120,000-user Decnet as essential in reducing research and development costs. "We design complex integrated circuits in Israel, and we do simulations in Hudson, Mass.," he explained. "Because our network is homogeneous and seamless around the world, these two groups feel they work in [adjacent] buildings instead of 7,000 miles apart."

When the Israelis finish a chip design, they mail the chip to Massachusetts, Ol-

sen said, and then "watch the test results on-screen as they are being carried out in Hudson."

Corporations smaller than the $2 billion Apple or the $11.5 billion DEC can also benefit from new price/performance levels set at the show. Among these was a $3,000 Schlumberger Technologies, Inc. Macintosh II package called Macbravo, which Apple claims can provide functionality similar to that of a Sun Microsystems, Inc. low-end workstation. Both the Mac II and the Sun system are based on the Motorola, Inc. 68020 chip.

Other highlights of the show included the following:

● Apollo Computer, Inc. in Chelmsford, Mass., introduced a rack-mounted, ruggedized version of its Series 3500 work-

stations. The Apollo DN3540, based on a 25-MHz Motorola 68030 processor, is priced at about $8,500.

● DEC in Maynard, Mass., demonstrated software that emulates an IBM 5080 graphics workstation running on a standard Vaxstation. The software supports the widely installed graphics-augmented design and manufacturing engineering software packages, DEC said.

● System Software Associates, Inc. (SSA) in Chicago announced a Cimpath product for IBM Application System/400, System/36 and 38 computers. SSA's Business Planning and Control System/ Cimpath uses bar-code data to track the flow of products through a factory, as well as to report inventory levels and time-and-attendance information.

Multivendor

IBM also announced the names of more than 30 Plant Operations Business Partners that are planning to make their applications available on the DAE platform by early next year, IBM said.

● Two CIM platforms at the show were the product of vendor alliances: Pyramid from Digital Equipment Corp. and Allen-Bradley Co.; and Stratus-CX from Stratus Computer, Inc. and Motorola, Inc. subsidiary Motorola Computer X, Inc.

● Hewlett-Packard Co. announced HP Device Interface System, a tool for developing factory device control applications. This is the latest addition to the HP-Industrial Precision Tool software development environment, which provides "starting blocks for folks that want to roll their own [CIM] software," said HP Product Manager Jane Forster. The first of these, announced last July, is a memory-resident database management system. HP plans to announce the HP Interactive Visual Interface, a common-user interface based on the X Windows standard, by year's end, Forster said.

Users expressed skepticism about vendors' ability to provide easy integration of all the devices they might want on the factory floor. While the computer vendors' so-called open platforms could "prove useful, we need a lot of different vendors, and it's a tough decision whether to go with one platform and preclude small vendors that aren't a part of it," said Ulf Anderson, director of information systems at Pratt & Whitney Canada, Inc.

"Sophisticated products like Pyramid look good theoretically, but you often find they don't completely meet your needs — and they are very expensive," said one manager from Continental Can Co. "We find it hard to cost-justify benefits that are so far off," the manager said.

"We have to make a good case for CIM," said Timothy Dirr, an engineering information systems manager at 3M Co. "Our goal is for information to go anywhere it needs to go. What we really want is one standard operating system [and] networking protocol. Even just two or three would be terrific."

AT&T wins $929M Air Force slugfest

BY AMY CORTESE
and MITCH BETTS
CW STAFF

Talk about customer clout. Competition was so intense for the coveted U.S. Air Force contract for 20,000 Unix multiuser systems that the winning bid from AT&T was 70% cheaper than the government expected.

The Air Force initially estimated a contract value of $3.5 billion, but AT&T's low bid came in at $929 million for one of the largest government computer contracts ever awarded.

The bid included AT&T's 3B2/600 minicomputers, a variation of AT&T's 6386 graphics workstation, the Unix System V operating system, Unify Corp.'s relational database management system and development tool and Venturcom, Inc.'s Prelude office automation software.

Robert M. Kavner, president of AT&T's Data Systems Group, said that all the vendors took into consideration technology improvements and cost reductions expected over the term of the multiyear contract.

"With this kind of competition, it's going to be hard for anyone to look back and say the government got a bad deal," he said.

Kavner said the win puts

AT&T's Kavner

AT&T's rocky start in the computer business behind it.

However, the real significance may be AT&T's coming into its own as a major player in the lucrative system integration market. In terms of functionality, the contract breaks out to approximately 60% software — of which operating software counts for a minimal portion — and 40% hardware, according to Gig Graham, director of software services at The Gartner Group, Inc. in Stamford, Conn.

With this award, Graham said, AT&T has repositioned itself as a company that can compete with IBM's Federal Systems Division. In the past, AT&T has relied on partner Electronic Data Systems Corp.

to win many of its contracts.

AT&T won out over five other big-league vendors: IBM's Federal Systems Division; Zenith Data Systems Corp. (with Hewlett-Packard Co. as its subcontractor); Honeywell Federal Systems; Planning Research Corp. (with NCR Corp.); and Lockheed Corp. (with Counterpoint Computers, Inc.).

The initial contract lasts two years, but the government can extend it to five for hardware and training and eight for software, maintenance and support.

A big to-do

Andrew E. Bilinski, the Air Force's deputy assistant secretary for command, control, communications and computer systems, noted that the Air Force Computer Acquisition Contract 251 was "one of the most controversial computer acquisitions in history."

The controversy over the openness of the Unix operating system began last year when Digital Equipment Corp. and Wang Laboratories, Inc. protested the AFCAC request for proposals, saying that it favored AT&T by specifying the Unix System V Interface Definition.

But a federal contract appeals board rejected the protest, saying that the Unix System V Interface Definition is freely licensed to other vendors and the Air Force had a legitimate interest in software portability [CW, Oct. 26, 1987]. Both DEC and Wang later withdrew from the competition.

Unix rift continues

Users see AT&T with edge over OSF renegades

BY AMY CORTESE
CW STAFF

At last week's Unix Expo in New York, there was evidence that momentum in the AT&T/Open Software Foundation (OSF) battle has shifted to AT&T. Many users attending the show claimed they were not concerned with the debate over the Unix kernel, but they tended to believe AT&T will prevail.

Echoing many users' reactions, Russell Kennedy, an information systems executive at General Foods Corp., said that AT&T will hold firm because of its installed base. He added that when the dust settles, he hopes there will be one standard. Doug Tenn, a systems analyst at Fiber Trading Group in Bellville, Ont., said his company has decided to stick with AT&T's Unix System V, characterizing IBM as a start-up in the Unix arena.

For a start-up, however, IBM stole the show. Its massive network, composed of a 3090 connected to a 4381 and myriad workstations, all running AIX, was a show unto itself — and was heavily attended by watchmen.

It is rumored that the display cost IBM upward of $2 million. Most attendees said they were impressed by IBM's show of commitment to AIX, although some expressed cynicism.

One of the cynics was Robert Kavner, president of AT&T's Data Systems Group, who gave his opinion during a press briefing Tuesday. Kavner said IBM's huge display demonstrated the company's commitment to AIX, but he added that AIX is a proprietary version of Unix not licensed to other vendors.

"If you buy an AIX product and stay within the IBM family, then you're in good shape," he said. "But that's not what the rest of that floor stands for."

AT&T and its supporters still disagree with the OSF on the basic issue of which Unix kernel a standard should be based on. AT&T and the Archer group

claimed Unix System V is a product today and that many manufacturers, software vendors and their customers have made significant investments in it.

The OSF, on the other hand, has taken up the issue of quality. Donal O'Shea, the OSF's vice-president of operations and development, said one reason for the slow penetration of Unix into the commercial sector is that current versions of Unix are not up to corporate MIS demands.

OSF said it will base its first release of OSF1 on AIX Release 3. "OSF1 will be the same as AT&T has talked about for System V, Release 5. By moving from the current System V, Release 3 to OSF1, customers will take two steps ahead," O'Shea said. Kavner has stated that AT&T will not compete on the basis of the operating system's quality but on where it can add value. When asked if AIX might be a superior product, Kavner vehemently denied it.

First this way, then that

While praising AIX one moment, the OSF is ambiguous the next. O'Shea said that everyone in the foundation is ready to use both Unix System V and AIX. "There are some features of System V we would love to have," O'Shea explained.

Meanwhile, Kavner has rejected any compromise on a base operating system other than System 5. He claims that by starting with a new kernel, OSF has a fundamental point of departure from the market.

Kavner offered one scenario that has been heard with increasing frequency. "There's no reason," he said, "that there can't be two implementations of Unix, with X/Open or Posix interfaces sitting on top."

Nevertheless, the unrelenting debate over the Unix kernel does not seem to be stalling user enthusiasm. The "It's OK to say the U— word" buttons that many attendees were seen sporting seemed to underscore the mood.

Surge

stalled by the end of this year. MCA-based Personal System/2s will dominate 1989 personal computer purchases at Fortune 1,000 sites, according to Computer Intelligence Co.'s Tom Young.

Supporters of the EISA bus, meanwhile, claimed that customer demand exists for an alternative to IBM, although none would cite statistics or figures to substantiate that statement. Nor would any of the EISA founders acknowledge what market situation would have to exist to make the MCA the 32-bit bus standard or what would prompt them to enter the Micro Channel market.

IBM said that three million PS/2s had been sold by the end of September. IBM also indicated that half of those sales included the MCA. It last week also refuted speculation that its licensing fees for Micro Channel utility patents were preventing makers of compatibles from entering the market. A spokeswoman said IBM has not charged more than a 2% royalty fee for the MCA, well below the 5% maximum charge it announced this year.

A Digital Equipment Corp. spokesman said that if IBM were to drop the MCA fee, DEC would consider selling a PS/2 clone. Last month, DEC said it had no plans to sell a Micro Channel clone, and Tandy Corp., which has an MCA licensing arrangement with IBM, agreed to let DEC resell its PCs. "We aren't [that] wedded to EISA," the DEC spokesman said. "We will entertain embracing the Micro Channel."

MCA slow to go

EISA members unanimously said they are developing MCA products, but aside from Tandy, which has already released such a system, only Ing. C. Olivetti & Co. has announced plans to release such an MCA product.

"They can sell as many Micro Channel machines as they want," said Wyse Technology's PC marketing manager, Chris Kryzan. "I don't have any crack at those machines' [sales]." Kryzan said customers are buying MCA machines because of IBM's solid reputation for product service and support.

But Epson America, Inc. Vice-President Steve Lapinski said that MCA market share is still up for grabs. Although he acknowledged that an MCA mar-

ket exists and that IBM has inundated its distribution channels, he maintained that clone vendors can under price IBM's MCA products if they choose to.

"I feel history will repeat itself," Lapinski said. "We've all been underneath IBM's [licensing] cloak and dagger before and their compression of pricing. We'll respond with [price/performance] comparisons."

But IBM has no intention of allowing such an event to occur. It has been 19 months since IBM first introduced the Micro Channel, which gives the company a tremendous advantage in fine-tuning its manufacturing techniques. As the only MCA vendor, IBM has the product's distribution channels well under control.

The EISA technical specification is not yet complete. But EISA vendors insisted that it is now possible to begin technical development on machines using the specification. The completed EISA technical specification will be distributed at Comdex/Fall '88 this week, one member said.

Last week at Microsoft's Presentation Manager announcement in New York, Entry Systems Division President William Lowe said IBM would make a "statement" about the MCA at Comdex.

Attendees browse *at Unix Expo*

DPMA targets non-MIS

BY JAMES CONNOLLY
CW STAFF

DALLAS — The Data Processing Management Association (DPMA) outlined plans last week for an attempt to broaden its membership base by reaching beyond the traditional MIS field into the user community.

DPMA officials addressing 550 members at the association's annual meeting here said the 1989 conference in Toronto will feature sessions designed to attract new attendees. Specifically, they seek users who come from non-MIS backgrounds but may, for example, be responsible for managing a four- to eight-user personal computer network.

Acknowledging that attendance last week was disappointing and slightly less than the turnout for the 1987 meeting, DPMA President Christian G. Meyer said the association hopes for increased non-MIS and vendor participation.

"The show was a modest success. Attendance was down from last year, but the show was well-executed and the speakers were excellent," Meyer said. "Next year, we are changing our emphasis. The market tells us we need to be more specific in our program."

John Hobbs, the DPMA's 1989 general conference chairman, explained that the association plans to offer a series of half-day educational sessions next year rather than relying on shorter general presentations.

National DPMA officials are counting on local chapters to recruit members from outside MIS, Meyer said. One drawing point, he noted, may be the growing number of special interest groups within the DPMA, citing the examples of local government- and knowledge-based systems groups established last week.

Meyer also said that the DPMA will eliminate the show portion of the conference, which drew only 36 vendors last week, in 1989 because of competition from another computer show being held in Toronto shortly after the 1989 conference. He said that the DPMA hopes to feature other types of vendor participation by recruiting vendors to sponsor specific sessions and events.

Several attendees said they looked forward to increased vendor participation, particularly if it means that major vendors such as IBM will provide information about product directions.

Cray-2 gets memory boost

BY JEAN S. BOZMAN
CW STAFF

MINNEAPOLIS — Cray Research, Inc. announced a $17 million extended-memory version of its Cray-2 supercomputer last week that it said provides 30% greater throughput than earlier Cray-2 models.

Cray said that it plans to ship the first Cray-2/512 to Minnesota Supercomputer Center, Inc., a supercomputer service bureau affiliated with the University of Minnesota. The new machine, which doubles the memory of the 256M-word Cray-2, will join three other supercomputers at the center: a Cray-2, a Control Data Corp. Cyber 205 — both purchased in 1985 — and a brand-new four-processor CDC ETA-10 liquid nitrogen-cooled supercomputer.

The latest Cray is slated to arrive in early December and will eventually displace the Minnesota Supercomputer Center's older Cray-2, center President John Sell said. The center plans to lease the new system while awaiting the 1990 or 1991 shipment of the Cray-3, he said.

"We already had the largest computer they made, and we were beginning to see that 256M-word memory as a limiting factor," Sell said. "We went to Cray a year ago to ask for a machine with more memory. Now, Cray will sell the Cray-2/4-512 as an official product that will serve the needs of other clients."
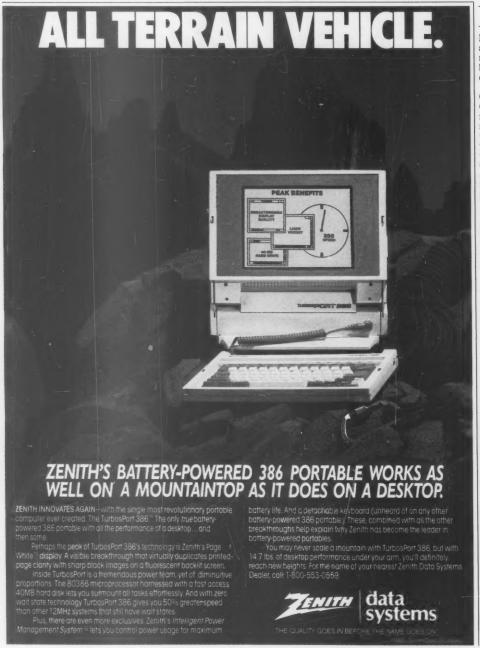
The Cray-2/4-512 supports 512 million 64-bit words, or 4.3G bytes, of directly addressable main memory. Its CPU uses 1M bit of dynamic random-access memory (DRAM) chips, in contrast with the Cray-2's 256K-bit DRAMs. The new machine's chips have an average access time of 80 nsec, compared with an access time of 120 nsec for the original Cray-2. To reduce jumps from buffer memory, the Cray-2's instruction buffer capacity has been doubled to 32 64-bit words.

And then there were five

There are now five Cray-2 models — two based on DRAMs and three based on older static-memory chips. The Cray-2 line ranges from $12 million to $17.5 million.

Sell said his center serves the computing needs of many universities and many Fortune 1,000 firms experimenting with supercomputer applications.

The pace of technology is pushing what once were powerful supercomputers out the door of the supercomputer center. One outdated Cray-1 is literally sitting in the center's lobby, Sell said, and is used as guest seating for the moment. "We think all supercomputers are interim machines," he said. "There's no such thing as a permanent supercomputer."

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IBM The Bigger Picture

Bus wars behind the curtain at Comdex

BY WILLIAM BRANDEL
CW STAFF

Just when you thought you had escaped the political jockeying, hyperbole, polling and caucus decisions and were ready to get down to some cut-and-dried tangible technology, Comdex/Fall '88 in Las Vegas arrived.

But unlike this year's election, there is an issue at stake, and steps will be taken at Comdex to resolve it.

Taking a page out of yesteryear's smoke-filled caucus room, personal computing's latest big dilemma may be solved with a subtle nod or shake of the head in a hotel suite on the neon-soaked Vegas strip, according to industry analysts, personal computing movers and shakers and observers at large. This year's issue is, of course, the Micro Channel Architecture (MCA).

Tally ballyhoo

According to those in the know, many IBM Personal Computer clone vendors will not showcase their leading-edge products, the Personal System/2 clones, on the showroom floor. Many are voicing support for the Extended Industry Standard Architecture (EISA), announced in September. And it is off the showroom floor where they reportedly intend to tally the ballots for the MCA.

"You'll see quite a few MCA products," said John Dunkle, vice-president of the Aberdeen Group, a market research firm located in Boston. "The interesting point will be whether the EISA founders and supporters will openly announce dual product lines."

Like most industry analysts, Dunkle contends that this year's Comdex will not have a dominating technological theme. This lack of a theme is because of the PC market's present state of flux, which has in turn resulted from the MCA-EISA dispute. Previous Comdexes had obvious themes because they happened at times of obvious technological direction. For example, last year's Comdex was a show of support for IBM and Microsoft Corp.'s OS/2. But at this time, analysts say, neither the EISA nor the MCA camp can claim to be champions of the PC cause, which brings into question the PC market's technological direction in the near and distant future.

"None of the PC products, whether PS/2 or EISA, have made a mark yet," Dunkle said. "And so it will be something like 'There's the flag; who saluted?' It won't be until next Comdex that the real product lines will come out."

"The personal computing market is leery about its future," said Howard Cohen, product marketing manager at San Jose, Calif.-based Chips and Technologies, Inc., an IBM BIOS code and chipset provider for both IBM PC AT- and MCA-compatible computers. "With the cloud of EISA hanging over people, Comdex will actually be a bad time to show off new technologies. Everyone's working on a PS/2 clone. But at the same time, people are not committing to anything."
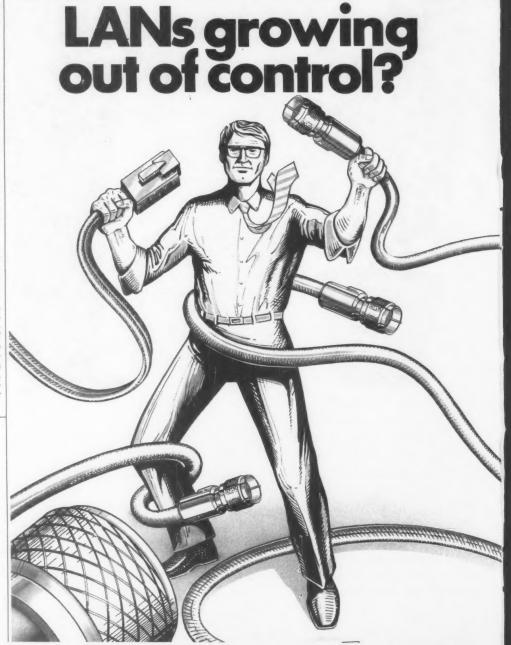
Cohen agrees that the show's main theme will be secrecy, and it will test the market acceptance of certain PC technologies. He estimates that between 10 and 20 PS/2 clones will be in Las Vegas during Comdex, although only a small percentage will make it to the show floor.

But some analysts believe that this Comdex will pick up where the last one left off.

"If there aren't applications for Presentation Manager, then I don't know what will be at Comdex," said Dick Shaffer, president of Technologic Partners. "That's the whole point of this Comdex — to get Presentation Manager out after OS/2 and before OS/2 Extended Edition."

Portable laptop computers could emerge as a possible sleeper at Comdex. Providing excitement in this area are recent announcements from Toshiba America, Inc., Grid Systems Corp. and Compaq Computer Corp. IBM is expected to make a laptop computer announcement soon, although most expect the announcement to be anticlimactic.

"There should be a lot of new players in the laptop market," Cohen said. "By introducing [its] past product, Compaq has just legitimized the laptop market."

PC options aplenty at show

Graphics, security features woo attendees

BY SALLY CUSACK
CW STAFF

Vendors at this week's Comdex/Fall '88 will be wooing PC users with promises of graphics options, expansion capabilities and enhanced security features. Some of the expected rollouts include the following:

• A hardware and software product developed specifically to design and execute business presentations is scheduled to be introduced by Visionetics Corp. in Torrance, Calif. Called Vipas, the IBM Personal Computer AT-based system reportedly captures video images in real-time mode from standard video cameras and videocassette recorders. The images are then integrated with text and graphics to create visual output for use in sales and marketing presentations, training materials and other applications. According to the vendor, the system accepts industry-standard image file formats as well as AS-CII files from word processors and graph files from Lotus Development Corp.'s 1-2-3 spreadsheet.

• American Mitac Corp. in San Jose, Calif., is set to display a prototype of its MPC4000, a file server and multiuser host with memory expansion capabilities. The tower-form Intel Corp. 80386-based machine incorporates a 25-MHz CPU and can accommodate up to six mass-storage devices.

The company said it will also introduce an Intel 80386SX-based computer designed to compete directly with Compaq Computer Corp.'s 386 machines. Dubbed the MPC2386, the product incorporates a 16-bit data bus and six expansion slots. The unit is expandable to 16M bytes of on-board memory with room for four storage devices, the vendor said. IBM Video Graphics Array (VGA) graphics are included with the motherboard.

• Quadram Corp. in Norcross, Ga., is slated to introduce QuadVGA Spectra, a register-level extended VGA graphics adapter. The board reportedly supports both 640- by 480-pixel VGA and 800- by 600-pixel extended VGA standards and is upgradable to support the emerging 1,024- by 768-pixel super-extended VGA resolution, the vendor said. The product reportedly works automatically in an 8- or 16-bit slot.

• A 15-in. color multiscan monitor for IBM Personal System/2s and Apple Computer, Inc. Macintosh IIs will reportedly be offered by Relisys Co. Designated the RE1520, the analog monitor was designed for high-resolution color applications and is reportedly compatible with color graphics boards using the IBM 8514 display graphics standard. The company is based in Milpitas, Calif.

• Star Gate Technologies, Inc. in Solon, Ohio, is scheduled to announce several adapters for IBM PC and compatible environments.

ACL-IIS, a high-end addition to the company's ACL intelligent serial-card family, is a four- or eight-channel communications adapter for ATs and compatibles. It can reportedly be converted between asynchronous and synchronous channels in the field.

An intelligent expansion adapter for ATs will also be introduced, Star Gate said. The Intel 80188-based ACL-IIR adapter features modular RJ-12 connectors for system flexibility and more cost-efficient installation, the vendor said.

Designed specifically for the PS/2, the ACL-MC intelligent serial board features 128K bytes of buffer random-access memory. The asynchronous adapter is said to be fully compatible with IBM's Micro Channel Architecture, and it can be configured to add four or eight channels to a single PC expansion slot.

• Foundationware, Inc., based in Cleveland, will reportedly announce a product designed to enhance standard local-area network security features in DOS networks. The system, called Corporate CPR-FS, includes control, prevention and recovery features, the vendor said.

Mid-ranges, peripherals share stage

While personal computers steal center stage on the show floor this year, mid-range computer and peripheral vendors should be able to hold their own with a smaller — but nonetheless healthy — showing of products.

• CIE Systems, Inc. said it will introduce a high-end addition to its 32-bit multiuser business computer systems family. The CIE 680/750 is reported to be a 512-user supermicrocomputer that combines advanced CPU, memory and disk technology with a proprietary version of the Pick Systems Pick Operating System.

The base system is structured around a Motorola, Inc. 68030 microprocessor and dual-bus architecture. It can support up to 66M bytes of random-access memory and 48M bytes of disk-cache space, the vendor said. The base configuration is shipped with CIES Pick Version 7.0. Headquartered in Irvine, Calif., CIE Systems is a subsidiary of C. Itoh Electronics, Inc.

• MCBA, Inc., in Glendale, Calif., is scheduled to display its Classic Accounting, Classic Distribution and Classic Manufacturing software for Unix-based machines. The 19-package system consists of a closed-loop manufacturing resource planning application that integrates manufacturing planning and control functions with accounting, order processing and inventory management applications.

The system is written in Ryan McFarland Corp.'s RM Cobol 85 and runs in several Unix and Xenix environments, including IBM Personal Computer ATs and compatibles under The Santa Cruz Operation's SCO Xenix, NCR Corp.'s Tower series under Unix and Altos Computer Systems, Inc. systems under Altos System V.

• Miltope Business Products, Inc. is slated to announce two nonimpact ion-deposition page printers designed for mid-range computer users. Printing application environments include IBM's Systems Network Architecture and Binary Synchronous Communications.

Miltope's Series 30M is a 30 page/min, cut-sheet paper printer that includes two 500-sheet input feeders and two output bins. The Series 37 offers a 37 page/min, continuous fanfold output and features a powered stacker.

Both units reportedly provide letter-quality printouts at 300 by 300 dot/in. and are rated at monthly volumes of up to 250,000 pages. The company is based in Melville, N.Y.

• Sunriver Corp. will introduce an 800- by 600-pixel 16-color IBM Video Graphics Array version of its Fiber Optic Station. Developed for computer-aided design (CAD) environments, the product is especially suitable for manufacturing, engineering and desktop publishing work groups, according to the vendor.

The Jackson, Miss.-based company will also demonstrate a variety of CAD, desktop publishing and office automation products running under several multiuser DOS, Unix and Xenix operating systems.

• Plasmon Data Systems, Inc. in San Jose, Calif., is set to announce 200M- and 400M-byte optical media offering compatibility with the Wang 47 GB automatic media changer from Wang Laboratories, Inc.

The storage devices were designed for organizations in which large volumes of data must be maintained securely. According to the vendor, once the initial data is stored on the optical media, it cannot be accidently or maliciously removed from the disk.

• A family of high-speed, 8-in. Winchester disk drives for Digital Equipment Corp. VAXs will reportedly be unveiled by Century Data Systems, Inc. in Anaheim, Calif.

The DS21200 and 22400 offer 900M bytes and 1.8G bytes of formatted capacity, respectively. The storage devices reportedly offer 100% compatibility with DEC's Unibus, Q-bus, HSC50/70 cluster controllers and VAXBI bus.

SALLY CUSACK

Tandem adds multiple CPUs

BY J. A. SAVAGE
CW STAFF

CUPERTINO, Calif. — Giving users more room to grow with memory, Tandem Computers, Inc. is set to introduce today four high-end configurations of its Nonstop VLX mainframe with four to 32 processors. The firm also added two entry-level VLX configurations, main-memory modules and a disk-storage facility.

"The enhanced productivity will help convince people they don't need an IBM 3090 in order to grow," said Sandra Gant, an analyst at Santa Clara, Calif.-based Infocorp. Gant said users are beginning to accept that the company is moving out of its fault-tolerant niche and into general computing, running into the big players like IBM and Digital Equipment Corp.

The new configurations replace seven older models, which means the company is dropping the three- and 24-processor models. The top of the line is still the 32-processor model, the primary difference being increased main memory — up 256M to 512M bytes — and increased disk-drive capacity — from 24 to 32 drives.

One of the four high-end models is the firm's Guardian proprietary operating system, which was not previously bundled with Tandem's mainframes. The entry-level processors are less expensive than the older models, and the high-end models, including the operating system, are more costly. New main-memory modules are available in 16M, 24M and 48M bytes using dynamic random-access memory chips. The modules cost $54,500, $75,000 and $115,000, respectively.

A disk facility, called XL80, stores 7G bytes of formatted data in a 6-sq-ft footprint, according to the company. It is Tandem's second storage subsystem based on Intelligent Peripheral Interface-2. With four to eight disk-drive modules, the price ranges from $115,000 to $180,000. The drives require two to four controllers priced at $20,000 apiece.

Arthur Andersen sues consultants who jumped ship

BY CLINTON WILDER
CW STAFF

NEW YORK — The simmering dispute between Arthur Andersen & Co. and its former information systems consultants erupted in court last week when Andersen filed suit against the defectors for a host of alleged offenses, including employee raiding, theft of trade secrets and client interference.

The suit, filed in New York State Supreme Court, names eight former Andersen consultants and Saatchi & Saatchi Ltd., the rival British consulting firm now employing them. Andersen's suit came less than two weeks after Saatchi & Saatchi announced the formation of The Information Consulting Group, Inc., a spin-off consultancy bankrolled by Saatchi & Saatchi and devoted to MIS consulting [CW, Oct. 31].

Andersen has accused the defendants of a conspiracy to coerce the Chicago-based Big Eight firm to sell its MIS consulting practice, recently renamed Andersen Consulting, to Saatchi & Saatchi. Andersen rejected both a 1985 offer from the London-based firm to buy the practice and a subsequent proposal by the former head of its worldwide practice, Victor E. Millar, to sell or spin off the Andersen consulting business.

Andersen is the second Big Eight firm to go to court this year to fight departed information systems consulting partners. Arthur Young & Co. sued the five top partners in its Midwest practice after they left to form a Chicago-based competitor, Technology Solutions Co. Technology Solutions later countersued [CW, June 30].
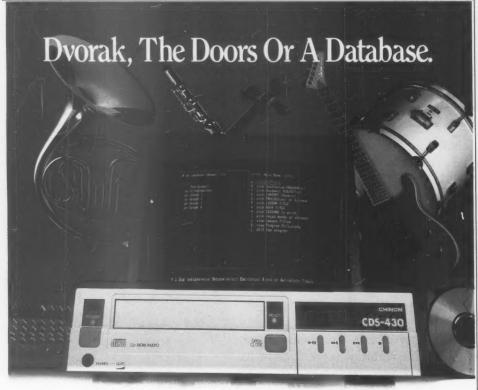
Big stakes

Both disputes illustrate the explosive tensions building within the once-staid auditing firms over the fast-growing and lucrative field of information technology consulting.

"Their consulting is becoming almost as big as [their] auditing, and some consulting partners feel underpaid," said David Lord, managing editor of *Consultants News*, a trade publication in Fitzwilliam, N.H. "Information systems is the hottest segment in management consulting."

According to Lord, several of the former Andersen partners named in the suit were lured by Saatchi with $1 million annual compensation offers.

Lord said he was surprised that Andersen, by far the largest Big Eight player in MIS consulting, would perceive such a competitive threat from its former partners. "Andersen had maintained a position that this [firm] would not hurt them, but the suit indicates they feel they are being hurt," he said.

Millar, one of the defendants in the suit, joined Saatchi & Saatchi in late 1986 with a charter to build up the firm's MIS consulting business. Gresham T. Brebach, another defendant, was fired as the head of Andersen's U.S. consulting in May for developing a business plan and soliciting other partners for a competing venture, according to the suit.

EDITORIAL

No real choice

COMPUTERWORLD HAD INTENDED to break with tradition this year and endorse a presidential candidate. Unfortunately, the vacuousness of the campaign, the ideological hysteria being used to divide the nation and, less significantly, the location of our main office in the state governed by one of the candidates force us to sit this one out.

We can, however, present an agenda of information issues the next president must deal with. They will not be easily addressed in a sound bite.

• **Productivity.** Computers are tools for regaining momentum, both in the factory and the office. The government can lead by targeting the federal bureaucracy as a model for computerization and requiring contractors to follow international communications and software standards.

• **International trade.** To bring the trade deficit down, we must sell more products abroad, not limit imports. It is imperative that we grab the lead role in emerging technologies and awaken dormant markets for our expertise.

• **Aid to small business.** Corporate megamergers are draining investment dollars out of the venture capital pools. We cannot shut out small companies, the foundation of this industry.

• **Privacy.** It is only a matter of time until the Supreme Court deals with the issue of who has access to the vast stores of electronic information that public and private agencies have collected about individuals. What principles will the justices apply to that question?

• **Industrial competitiveness.** Protective trade barriers should be used as a persuasive tactic to encourage other countries to open their markets, not as a cocoon in which to wrap industries that cannot compete globally.

• **Education.** The most critical problem facing the U.S.'s technological future is the loss of our edge in science and mathematics. We must lead in the application of computers to the classroom and in innovations in technical education.

From our Massachusetts base, we have seen that Michael Dukakis has the ability to converse with executives in the computer industry, and he has been a force in fostering a pro-business atmosphere in the state. Unfortunately, he has been unable to say how he would extend the "Massachusetts Miracle" to the nation.

George Bush is riding the wave of good feelings that accompanies the economic expansion of the past few years, but we have grave reservations about his decision to relegate the nation's staggering debt to the backwaters of political expediency. We are also concerned about the current administration's apparent lack of concern about a financial industry in which paper wealth plays a predominant role at the expense of creation of material goods.

We have viewed this campaign with dismay. Neither man seems to have the ability or willingness to take an issue by the horns and lead the nation to address it. We can only urge you to vote your best guess on which of these two men seems best prepared to deal with reality at some point in the future.

LETTERS TO THE EDITOR

Still a man's world

I found it interesting that your list of MIS executives with the *Computerworld Premier 100* companies underscores the glass-ceiling trend identified in your review of *The Best Companies for Women* by Baila Zeitz [CW, Sept. 12].

Of the MIS executives with the Premier 100 companies, 96% are men and only 4% are women. Of those 96 male MIS executives, 56 had the title of vice-president. There were no women MIS executives with the title of VP; all the women held the generally lesser paid titles of director or manager.

Although women may have a relatively easier time entering the MIS field, I suspect women MIS executives still earn the national average of 61 cents for every dollar that men make.

Karen Ashmore
Dallas, Texas

Mobile solution

Computerworld readers and W. Frank King (CW, Oct. 17) should be aware that there already are portable products that run where Lotus' 1-2-3 is attempting to. Time Intelligence, a multidimensional financial database system from Thorn EMI Computer Software, became available April 1 and runs on VAX/VMS, VM, MVS, Wang VS, DOS, OS/2 and Unix, providing identical functionality under all environments. This was achieved through the single-source software technology described in the ADAPSO paper "Portable Software Products."

John L. Kopcke
President
Kopcke and Associates, Inc.
Bedford, N. H.

Not so reliable

Your In Depth article "Quantum computing" [CW, Oct. 10] suggests the theoretical possibility of infinitely fast switches. This suggestion is based on the author's explanation that a quantum system that assumes one of two states jumps between them instantaneously. Unfortunately, this is not entirely right.

Because the energy of the two states is pretty well defined,

This week in history

Nov. 6, 1978
It is an affair like no other — the "Walt Disney Affair" — in which the Department of Housing and Urban Development's (HUD) supposedly safeguarded IBM 7074 issues Donald Duck a $99,900 paycheck.

The General Accounting Office was investigating possible abuses in federal overtime pay when it added Donald and 29 other cartoon characters' names to the HUD payroll as part of an audit check.

Nov. 7, 1983
Analysts yawn as IBM's long-awaited "Peanut" comes out of its shell as the PCjr. Major criticisms center on lack of sufficient memory for serious business applications, lack of total compatibility between the PCjr version of PC-DOS and applications written for Release 2.0 and 2.1 and a "toy-like" keyboard that wants for function keys.

the moment at which the jump occurs must be correspondingly uncertain. We can shorten the interval of uncertainty but only by blurring the energy levels. As the levels get too blurry, our measurements can no longer reliably distinguish between the two states. Thus, the faster the switch, the less reliable our determination of its state is. Nevertheless, your article clearly cites experimental progess along these lines.

I'd be very interested in the author's comments, particularly a confirmation that his 150 trillion instructions per second figure remains realistic. And, if so, when might such a machine be available? I know he says "speculation is risky," but perhaps if Steve Jobs reads his article . . .

John Forkosh
John Forkosh Associates
Jersey City, N. J.

Who needs race?

In a country that is trying to correct the wrongs of bigotry and prejudice, it seems strange to me to hear of a professional group, Black Data Processing Associates, oriented solely by race [CW, Sept. 26]. It would be interesting to know what the benefits are to have such a group. I would hope in today's world that groups do not require membership based on race, sex or creed.

John M. Sloan
Independent Consultant
New York

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Of change and the tortoise

HARVEY NEWQUIST

Getting new technology accepted in the hallowed halls and shrines of "traditional" business has never been easy.

From those who scoffed at the idea of silicon slices replacing vacuum tubes to those who snickered at personal computers as toys, new ideas oftentimes face an incredible barrier to overcome before they are deemed acceptable.

But as we all know, acceptance finally arrives and then the technology is promoted on its own red carpet — at least until the next technology takes its place.

Live or die

There is, however, a transition phase during which a technology must prove itself — either live or die by its performance.

Why is the transition phase

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

the most important means of developing long-term technologies? Let's take General Motors as an example.

Most everyone is familiar with GM's announcements for the ill-starred Saturn project, a factory of the future designed to make vehicles more efficiently than ever before.

Yet, the very decision to implement new and advanced technology was marred by the decision on how to implement it.

Rammed down throats

Instead of letting the technology emerge, evolve and otherwise take root throughout the company, certain levels of administration rammed it down the throats of those critical to its future success.

Even milk chocolate can taste pretty awful if it is being jammed into your mouth.

The company said, "Here's the plan. Do it. Don't argue." It expected to create a successful and fruitful environment overnight that started from scratch with leading technology. Talk about burning your bridges.

As we know, the Saturn project has been v-e-r-y s-l-o-w to get off the ground.

Yet, GM has implemented many successful projects — everything from artificial intelligence to robotics companywide.

The difference is this: foster-

CHRIS DEMAREST

ing these technologies instead of foisting them on unwilling developers and users. It is the approach that makes the difference between technology getting used or abused.

For instance, GM has deployed two successfully completed expert systems into the ranks over the last year.

The first, named Charley, is a diagnostic system that performs preventative maintenance on machinery in its production plants.

The second is the GMAC Credit Advisor, which has been installed in the hundreds of offices nationwide that are part of the GMAC loan and leasing network. This system helps the user make decisions about financial applications from buyers of GM products.

Developed over the last few years, these two systems have shown GM that slow and easy wins the race.

In fact, the company has seen that such a methodology works much better than diving helter-skelter into a new and largely unproven technology. Thus, it has scaled back its expert systems work by almost one-third to concentrate on specific areas in which it believes this technology can most successfully be applied in the near future.

This approach is in contrast with two years ago, when GM was attempting to develop dozens and dozens of expert systems in a more-the-merrier attitude. The new outlook on particular applications areas shows much more focus in disseminating new technology.

Done with mirrors

Interestingly, this approach mirrors the growth of PCs in MIS, data processing and even engineering departments.

As programmers and hackers started bringing their PCs to work to help facilitate their own work, department managers were faced with a bewildering array of machines from Corona, Eagle, Kaypro, Osborne, Franklin and Apple.

Management saw no benefit to putting toy computers in their organizations, which were dedicated to the well-being of minisupercomputers, superminis, minis and mainframes.

The helter-skelter approach to employing these machines did little good for the organization and, indeed, fostered the notion of PCs as "private" computers.

Thus, after the initial growth that spurred on visions of two computers in every garage, the machines faltered in the early 1980s, when they were banished

An open letter written to Comrade Sagdeyev

Comrade Roald Sagdeyev
Director General
Institute for
Space Research, Moscow
Union of Soviet
Socialist Republics

Dear Comrade Sagdeyev:

Your Phobos-I foible is so colossal that it might be the single largest cost blunder that anyone ever tried to cover up by claiming a computer program bug was the cause.

It must have cost the Soviet government at least 100 million dollars (in rubles, of course). Maybe the Soviet public is gullible enough to buy that old programming-bug story, but I'm not.

You told the Western press that your unmanned spacecraft, launched on July 12 for a landing on Phobos, a moon orbiting Mars, was accidently turned off almost 60 days into its mission, never to be turned on again.

You further said this failure happened because of the omission of a single character in the thousands of lines of code in the craft's control programs — in

Lecht is an IDG News Service correspondent based in Tokyo.

other words, a programming bug.

You'll forgive me if I say that I found your somewhat artistic redirection of our attention away from the bug and toward what happened as a result of it a bit disarming.

Monumental bug

Isn't such a monumental bug worthy of more than a passing remark? How did it avoid being noticed by scientists conducting land-based tests? Was there no quality assurance of the software? Was Phobos-I really brought down by the lack of a tiny character?

You explained that some time after its launch, the space probe's solar panel orientation was incorrectly set because of the bug.

This action, you told us, prevented Phobos-I from receiving enough sunlight to maintain its operating power.

You then poetically offered, "Phobos-I froze to death," a euphemistic phrase meaning the batteries went dead.

I felt as if I were reading a paragraph from *The Martian Chronicles* when you described the final days before Phobos-I's icy death.

You said, "Attempts to reestablish connection were being made throughout September. We continued in this way while there was the slightest chance that in a condition of unguided rotation, the solar batteries would manage to find the sun themselves. In the long run, the reserve of energy had become so small that the satellite was no longer able to fulfill any command or respond to anything, even the most powerful radio messages from earth."

After reading this account, I almost forgot all about the alleged programming-bug cause of Phobos-I's failure.

After I had time to reconsider, I decided to write you this letter to protest your assignment of Phobos-I's fade-out to a programming bug without your presenting more evidence to us.

In writing, I hope to strike a blow on behalf of all programmers everywhere who are unreasonably blamed when anything goes wrong in scientific research.

Public pronouncements accusing programmers of causing great disasters in research have encouraged a lot of resentment to be directed toward them, especially by people who haven't the slightest idea of what doing the research entails, including those who allot the rubles to do it.

Whenever anything goes wrong with any computer-based system, we all know who gets

the heat first — a programmer. I've never heard of a scientist who, after formulating a solution that failed, had the nerve to step forward to announce his role in the failure.

Saving own neck

Not everyone, Comrade, believes your version of what happened. We know you were trying to save your own neck by laying the responsibility for Phobos-I's failure on an innocent programmer. Who can blame you? Better to take on a single programmer than the whole Soviet military-industrial complex, which does not look kindly on having its hardware criticized.

The possibilities that the design of the Phobos-I control computer system was bad, that components failed, that Phobos-I's batteries were no good in the first place, that the solar panels fell off on launch or that a myriad of other nonprogram-related things could have taken place never crossed your lips.

Instead, you isolated one missing character in a program as the definitive cause, and then inquiry was over — case closed.

I suppose, Comrade, you were encouraged to use the missing-control-character excuse by its historic success in explaining monumental failures in America, England, France, Japan and other scientifically developed countries.

"Not to worry," you reassured us. "Phobos-II, a compan-

ion probe, duplicates just about all the experiments Phobos-I was to make, and it is not dead."

We admire your foresight in sending up a duplicate probe. And we hope that the bug, if there ever was one, that led to Phobos-I's lonely death was not duplicated too — though we assume the two crafts were running on the same software at the time of their launches, five days apart.

And we admire the frank way you told the press about Phobos-I's deep freeze. We see in it a sign of your government's new commitment to *glastnost*.

But, the spirit of *glastnost* demands correct content as well as form.

I do not dispute that the disaster could have been caused by so small an omission as one character in a computer program, but I hope not.

If it did, this matter gives me grave concern for our future — yours and mine. Does so much hang on so little in your entire space defense program?

You should forgive me if I also worry about the possibility that your nuclear arsenal may be accidently triggered by the omission of something as small as a decimal point in a line of code. Should the missiles be launched, it gives me little or no pleasure to note that there will be few programmers around on whom to place the blame, at home or abroad.

CHARLES P. LECHT

Newquist

from corporate America as a nonessential piece of technology.

But with the addition of power and increased memory to these computers, it became clear that they could handle essential tasks for the individual who was waiting for mainframe time to run something simple — perhaps a spreadsheet. Companies saw that they could foster the use — and thus the growth — of PCs into the mainstream by using them to address specific solutions for specific problems.

By using a gradual and controlled tactic of deployment, PCs came to be accepted in the very same places they had been

scoffed at less then four years before.

Today, the PC market is still the largest growing segment of the entire hardware business, even though its distinction as a "personal" computer has been blurred by its power as a "workstation" and its newfound abilities to network.

Chalk one up for the tortoise over the hare.

Many companies still look to advanced technology as a way to save tons of money or make big bucks.

But in my opinion, 100% of all technologies are overrated and underdeveloped when they first are brought to our attention.

Aren't you glad you haven't switched all your electrical materials over to the promises of superconductivity? Wouldn't

you have looked foolish if you'd thrown all your paper files out when optical storage and scanning became available? How would you be operating your computer system if you'd thrown out your keyboard in favor of a voice recognition device?

And trying to get any technology accepted overnight is impossible. Look at the metric system in the U.S. Look at the standards for Unix. Look at the standards for optical storage. Look at the adoption of anything and you see a long hard path of resistance from the established user community.

Haste makes waste
Too often, the brash hare of technology runs itself into the ground by trying to be everything to everyone all at once, only to

find that the crowd is rooting for the tortoise — a nice, easy-going, nonirritating creature that doesn't upset the way things have always been done — at least not noticeably.

Remember, at one time, computers didn't even have monitors. They didn't have disk drives. They didn't have microprocessors. They didn't have keyboards as we know them today. They didn't have hundreds of thousands of software packages available. They didn't even have much of anything but a room to themselves.

The technology tortoise has come a long way over the last few decades. But it has always taken prodding from the technology hare to get it to keep "racing" forward.

BOOKS IN BRIEF

Hands-On Hypercard
By Mimi Jones and Dave Myers
The creator of Apple Computer, Inc.'s dealer training courses on Hypercard and a computer-industry writer combine to guide readers into quick use of the program.
Paperback, $22.95, 432 pages, ISBN 0-471-61513-7, by John Wiley & Sons, New York.

Blue Magic
By James Chposky and Ted Leonsis
A year in the life of the team building IBM's Personal Computer, introduced in August 1981.
Hardcover, $19.95, 228 pages, ISBN 0-8160-1391-8, by Facts on File Publications, New York.

Competing for Control
By Michael Borrus
Subtitled "America's Stake in Microelectronics," this book says that the decline of competitiveness by U.S. high-technology organizations against Japanese organizations now threatens even computer industry giants IBM and Digital Equipment Corp.
Hardcover, $32, 288 pages, ISBN 0-88730-306-4, by Ballinger Publishing Co., Hagerstown, Md.

Software Sources
Edited by Thomas Jackson
This is a buyer's guide complete with information to compare 3,500 personal computer software programs for the IBM PC, PC XT, AT, Personal System/2 and compatibles.
Paperback, $24.95, 416 pages, ISBN 0-912442-50-6, by Software Sources, Burbank, Calif.

Unix Administration Guide for System V
Rebecca Thomas and Rik Farrow
The essential procedures for administering an AT&T Unix System V system, from startup through shutdown.
Paperback, $34.95, 636 pages, ISBN 0-13-942889-5, by Prentice Hall, Englewood Cliffs, N.J.

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Book Review Editor, Computerworld, P.O. Box 9171, 375 Cochitutate Road, Framingham, Mass. 01701.

Compared to KnowledgeWare CASE tools
the others look like toys

Drawing diagrams on a screen sure beats pencils and plastic templates. And if drawing diagrams is all you want, just about any tool will do.

But most people want a tool to assure high quality system specifications and designs. And hundreds of CASE users have "graduated" to KnowledgeWare's *intelligent* CASE solution, the Information Engineering Workbench® (IEW). Here's why:

Dictionary-based tools can't assure consistency

Most CASE tools are dictionary-based. They store graphic components of diagrams (boxes, lines, arrows, etc.) in one file...and store descriptions separately in a dictionary. You have to create diagrams, *manually* describe what they mean, then *manually* link the descriptions to the diagram components. If you forget anything, the diagrams get out of sync with the dictionary. And this leads to inconsistent systems specifications and designs.

KnowledgeWare's Encyclopedia guarantees consistency

KnowledgeWare tools *interpret* the actual meaning behind diagrams (object types, relationships, associations, etc.) and store that information in a single knowledge-based "Encyclopedia." Request a diagram and our expert system *draws* it from stored knowledge. So it's *impossible* for diagrams to be inconsistent with the Encyclopedia.

Keeps all diagrams up to date all the time

The specification and design of computer systems requires iterative changes. And each change can impact many diagrams. With most dictionary-based CASE tools you must repeatedly update every affected diagram, because each is an independent picture.

It's much easier with KnowledgeWare CASE tools. Each time you enter or modify information through a diagram, the expert system updates the Encyclopedia. And all diagrams automatically reflect current knowledge.

Enforces the rules of computing

Most CASE tools allow software engineers to specify and design systems that can't be constructed. Their diagrams may have missing inputs, circular relationships, or outputs that go nowhere.

KnowledgeWare's realtime expert system automatically checks and enforces hundreds of logic rules. It calls attention to errors and inconsistencies. And it checks for completeness. All without limiting you to any particular methodology. This automatically assures that specifications and designs can be translated into real systems.

Automatically redraws information in other formats

A dictionary-based tool that stores diagrams as boxes, text, and arrows can reassemble those parts on the screen. But you only get back the same diagram that you put in.

Since KnowledgeWare CASE tools store objects and relationships, you can display that information in various ways. For example, use our Analysis Workstation to draw a Data Flow Diagram. The Analysis Workstation can then automatically construct the corresponding Process Decomposition Diagram.

Provides a state-of-the-art user interface

Most CASE tools have not kept pace with advances in user interface technology. Some may even require you to learn different interfaces in different parts of their product.

KnowledgeWare workstation tools are mouse-driven with pull-down menus. You can view many diagrams and definitions at the same time in multiple windows – and in different colors. You can zoom in and out, nest diagrams, mask out distracting elements, and highlight the path of information through a number of diagrams.

For more detailed information on KnowledgeWare's Planning Workstation, Analysis Workstation, and Design Workstation, or any of our mainframe CASE tools, call 1-800-338-4130 toll-free (in Georgia, call 404/231-8575).
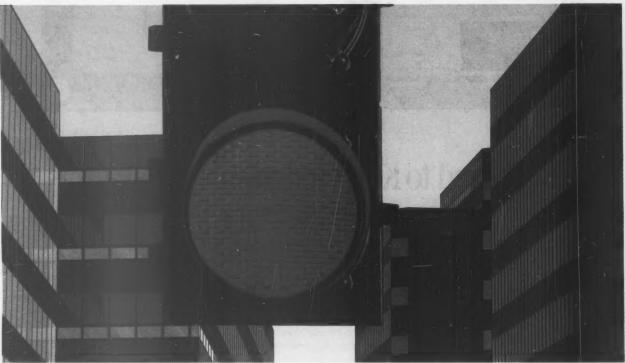
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SYSTEMS & SOFTWARE

PR/SM's many facets

IBM's PR/SM may be the greatest thing since sliced bread. In a way, it is very much like sliced bread; it's a way of physically partitioning an Enterprise System/3090 mainframe into as many as six processors, each of which acts as a preferred guest. Two-sided multiprocessor 3090s can gain six guests per side. PR/SM can be a boon to users who want to add applications without adding CPUs.

With the recent announcement of DB2 Release 2 Version 2, IBM said that PR/SM, previously capable of partitioning a CPU into four logical units, can now partition one into six.

It turned out that the capability to partition into six had been an inherent PR/SM capability all along, but IBM did not announce it at first. Big Blue had to make sure all the bugs were out, it said.

In a recent conversation with IBM officials, I asked just what the physical limit of PR/SM is. The answer was that there is no conceptual limit to the number of partitions possible, but as a practical matter, users will need only a few. The

Secure Unix aimed at fed deals

ANALYSIS

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Away from the high-profile posturing that currently surrounds AT&T's Unix operating system, Unix quietly gained some valuable security features during October.

At the Federal Computer Conference and in separate announcements Oct. 25 and 26, several vendors announced secure versions of the Unix operating system to help them capture contracts with defense and intelligence agencies and aerospace companies.

Vendors that disclosed they have secure Unix products in the government's certification pipeline include Harris Corp., Sun Microsystems, Inc., Apollo Computer, Inc. and Computer Consoles, Inc.

The move toward secure Unix systems was inevitable, federal marketing experts said. Government procurements began to require Unix at the same time that the U.S. Congress and agencies such as the National Security Agency (NSA) were promoting greater security for sensitive systems.

The government will purchase $1.93 billion worth of Unix systems in 1988, and 61% of that spending will be by defense agencies, according to Novon Research Group, a market research firm in Berkeley, Calif.

In addition, the U.S. Department of Defense recently issued Directive 5200.28 requiring that virtually all multiuser computer systems meet at least the C-2 level of computer security by 1992.

The security levels are determined by the NSA's National Computer Security Center at Ft. Meade, Md., which tests operating systems and assigns them ratings. The C level provides for need-to-know protection, audit capability and user accountability, while the B level adds mandatory access controls.

Lee Musick, program manager for federal systems at Apollo, said one reason for the flood of

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Inside

• Distributed processing gives United Airlines subsidiary a lift. Page 27.
• Grumman establishes mini support center. Page 27.
• SAS Institute trundles out Release 5.18 of system for VAX/VMS. Page 35.

X/Open scores in Europe

BY MITCH BETTS
CW STAFF
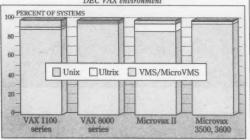
WASHINGTON, D.C. — Government agencies in the U.S. and Europe are starting to endorse the software portability environment promoted by the X/Open consortium.

At the recent Federal Computer Conference, X/Open Co. announced that its vendor-independent Common Applications Environment (CAE) has been adopted by four European government agencies for system purchases.

In addition, the U.S. Department of the Treasury is report-

Data View

Still king of the mountain

VMS reigns as predominant operating system in the DEC VAX environment

PERCENT OF SYSTEMS

☐ Unix ☐ Ultrix ☐ VMS/MicroVMS

VAX 1100 series · VAX 8000 series · Microvax II · Microvax 3500, 3600

SOURCE: COMPUTER INTELLIGENCE
CW CHART

Beta users on Microvax

BY JAMES DALY
CW STAFF

Beta users of the latest mid-range additions to Digital Equipment Corp.'s Microvax line praised the new kids on the block for their processing speed but complained that the new storage element interface on the 3300 and 3400 crimps their ability to employ high-capacity, third-party storage elements.

"Its quickness still surprises me," said Neil Baldridge, vice-president of Compu-Share, Inc. in Lubbock, Texas, who was one of several early users surveyed recently by *Computerworld*. Baldridge said his pair of 3400s can often go neck-and-neck with his 3600 machines.

The rollout also ushered in DEC's low-end storage technology, the RF30 Integrated Storage Element, which is a 5¼-in. unit containing both a controller and a disk drive that is based on DEC's high-end RA series drives.

But some users complained that the RF30's Digital Storage Systems Interconnect (DSSI) in-

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Blurred images

The image systems market has entered a phase of heated competition, with vendors making claims and counterclaims about their systems. This, not surprisingly, came about shortly after IBM tossed its hat into the image systems ring.

This also spells confusion for users, particularly for IBM shops. But perhaps these users can simplify matters by taking two steps. First, line up your requirements for image systems and then ask yourself a simple question: How soon do I need this?

If an IBM shop has an immediate need for a system and wishes to tie in that system to an IBM mainframe setup, then a look at the vendors with commercially available systems today would be a solid choice. Wang Laboratories, Inc. and others currently meet those requirements.

But if the need for an image system is not immediate and the user prefers the image system to be a built-in component of the IBM mainframe environment, then it's worth waiting to see what IBM eventually releases. That may be at least another year. IBM plans to announce a general availability date for its image system in the first quarter of 1989.

IBM sounds pretty confi-

Covia rolls out distributed system

ON SITE

BY JEAN S. BOZMAN
CW STAFF

DENVER — Covia Corp., the United Airlines subsidiary and keeper of the Apollo airline reservations system, is about to spread its wings by implementing distributed processing.

The heart of the Apollo system — four IBM 3090 Model 200s, customized for the airlines industry — will remain where it was first created in the early 1970s. But several supporting CPUs, which will be moved by December into a new building now being finished here, will run a new hotel and car-rental reservation system.

Covia hopes the move can sharpen its competitive edge in its battle with other computer reservation systems, including American Airlines, Inc.'s Sabre, Texas Air Corp.'s System One and Trans World Airlines' and Northwest Airlines' PARS system. Covia's new building is a $25 million dollar investment

that gives Apollo plenty of growing room, doubling its current 60,000 square feet of computer-room floor space to 120,000 square feet.

The Apollo network now supports 50,000 terminals in 10,000 travel agencies worldwide. But the firm's strategy is to go after a great deal more agencies, expanding its market share beyond the 26% now estimated by the DMW Group, Inc. in Holland, Mich. That is second to American Airlines' Sabre system's 36% share, DMW said.

"We're no longer on the edge of capacity for Apollo," said Brad Boston, director of Apollo computer operations. "We're no longer in the position of having to buy the biggest and best hardware. Our distributed architecture approach is offloading the processing [from the central complex]."

When that complex was trying to handle all functions itself, response time slowed and managers were pressed to add capacity. Currently, the system hums

Covia's Boston

along at 1,500 transactions/sec. The key to distribution of functions such as Apollo's International Fare Quote system is Covia's Open Systems Manager (OSM) interface. OSM, written by United Airlines MIS programmers in the mid-1980s, allows Apollo to reroute inquiries away from the Apollo core. Those functions are redirected into dedicated machines, unburdening the host system and decreasing response time. OSM has another purpose in Covia's mixed-vendor network: It also

Building vs. buying

Much of the software United Airlines needs to run its airport operations, from check-in to baggage handling, cannot be bought off-the-shelf.

"We use the classic definition of a build vs. buy decision," said John Testa, United's director of product and systems engineering. "If we can acquire a product that meets our needs, that's our first choice," including operating systems, utilities, fourth-generation languages and accounting packages.

"But many times in our business, there are unique applications that we have to build," Testa said. That's when Covia's 1,200-plus programmers have to bridge the gaps, creating a new baggage-handling system for Chicago's O'Hare International Airport and a new kind of airline ticket that is printed on a computer card.

"We have to be the glue that hooks all the different technical pieces together," said Janet Wejman, a systems engineering manager based in Chicago. "We have to serve a lot of masters, including the travel agencies that use our micro-based Focalpoint software and United Airlines." Focalpoint, about to get a new release to boost transmission speeds, had to be tested by hundreds of travel agents to ensure ease of use.

Last week, the latest piece of Covia software was announced: a laptop-based reservation system for Japan. Covia has also taken on the role of Microsoft Corp. value-added reseller, which should result in more Windows-based programs for the travel industry, Wejman said: "We feel some of Microsoft's tools, like Excel, can play in our market. Instead of writing our own spreadsheet, for example, we'll share information between Covia's Focalpoint and the Microsoft packages."

JEAN S. BOZMAN
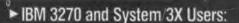
HARD BITS
Grumman adds mini support for end users

The data systems division of **Grumman Corp.** has set up a minicomputer support center for end users. Previously, the MIS staff of the aircraft and electronics systems maker had tackled end-user issues with two centers: an information center for mainframe support and a personal computer center.

Grumman reports that minicomputers are becoming increasingly popular among users for mainframe data transfer and

departmental applications. Grumman, which has a total MIS force of approximately 4,000, will also use the minicomputer center to evaluate new hardware and applications.

Currently, the minicomputer center has four systems: a Digital Equipment Corp. Microvax, a Wang Laboratories, Inc. VS system, a Hewlett-Packard Co. 3000 Series minicomputer and an IBM 9370.

Xerox spawns XIS, eyes scanners

BY JAMES DALY
CW STAFF

MOUNTAIN VIEW, Calif. — Xerox Corp. has set its sights on the emerging document scanning market by consolidating two of its peripherals companies and arming the newly launched firm with a handful of new products.

Xerox Imaging Systems, Inc. (XIS) — which resulted when Datacopy Corp. in Mountain View, Calif., and Cambridge, Mass.-based Kurzweil Computer Products were boiled down into one — will become an independent, wholly owned subsidiary and spearhead Xerox's thrust into the field.

Both Datacopy, which Xerox purchased in May, and Kurzweil, which the firm acquired in 1980, offer a broad range of optical and intelligent character recognition scanners.

XIS' first offerings will be a high-performance Datacopy scanner and two Kurzweil scanning systems. Datacopy's 300 dot/in. 730GS flatbed scanner offers six-bit gray-scale information and 64 levels of gray, the company said. The 730GS scanner sells for $1,995, while a text scanning version sports a

$2,195 price tag.

The Kurzweil K-5000 is a personal computer-based system for high-volume applications that sells for $15,950. The Kurzweil Discover 7320 Model 5 is geared more for general business environments where throughput requirements are

moderate. It sells for $4,995. Both are available immediately.

XIS also announced the release of PC Image software Version 1.5 to support Datacopy's family of image processing scanners. Version 1.5 is scheduled to be available in January. Users who bought PC Image after Oct.

1 will automatically receive an upgrade to the new product upon receipt of their registration cards.

A recent study by Framingham, Mass.-based market research firm International Data Corp. states that demand for scanners will increase at a compound annual growth rate of 110% through 1991. Another report by CAP International,

Inc., a Norwell, Mass., research firm, estimates that U.S. sales of desktop publishing systems incorporating image scanners will top $4 billion by 1990, up from $285 million in 1985.

Former president and chief executive officer of Datacopy Rolando C. Esteverena will head up XIS, and the company will retain both the Datacopy and Kurzweil brand names, Xerox said.

Grumman

Siemens Information Systems, Inc. recently introduced a slower laser printer for users who do not need the high-volume output its current printers provide. The new 50 page/min printer will be sold directly and through OEMs. It will be available in April 1989, Siemens said. Prices start at $79,500.

Stratus Computer, Inc. recently opened customer support centers in Japan and France. Offering remote and on-line support, the new centers will bring the company's number of worldwide support centers to seven.

Multiflow Computer, Inc. signed a deal with MacNeal-Schwendler Corp. (MCS) that will enable it to eventually market the MCS/Nastran line of software on its scientific and engineering systems. MCS will convert the software, which is an engineering analysis package, to the Multiflow platform.

Arix Corp., a maker of Unix-based mid-range computers, plans to sell the Oracle Corp. relational database management system and Transaction Processing Subsystem (TPS). This is the second agreement between the two firms in one year. Arix said the Oracle TPS will be available in first-quarter 1989.

Covia

bridges the gap between United Airlines' Unisys Corp. 1100 mainframes and Covia's IBM systems.

Today, Boston says he reserves the option of adding four more IBM 3090s to the central Apollo system. The upgrade will be made easier by the near-term release of TPF 2.4, which supports tightly coupled processors. Until now, the system had to be kept at four dyadic processors because TPF could only handle eight simultaneous images.

John Testa, director of product and systems engineering at Covia, is — like Boston — trying to get away from having systems requirements force purchasing decisions. "We're trying to get off the leading edge," Testa said. "When you're out on the leading edge, you're dependent on the next release from your vendor."

Nonetheless, Covia plans a number of upgrades:

• The replacement of aging CC 85 front-end processors, scattered throughout the U.S., with IBM 3725 or equivalent IBM-compatible SNA controllers.

These front-end processors, made by Computer Communications, Inc. in Torrance, Calif., are the first stop for travel agency queries and are sometimes the source of bottlenecks.

• The creation of more support systems under IBM's MVS/XA operating system. The first, a car and hotel reservation system, is running on an IBM 4381 going into the new building.

• The move toward unattended operations in the new Denver facility.

• The replacement of aging dumb terminals in airports with intelligent diskless IBM Personal System/2 Model 50s and 60s. These PS/2s will be linked through IBM's Token-Ring network, already installed at O'Hare, Denver's Stapleton Airport and Washington, D.C.'s Dulles Airport. All three airports are United Airlines hubs.

Covia's Testa

Gibson

maximum of six offered per CPU engine is more than most users require, they said. Conversations with users show that this appears true in a good number of cases.
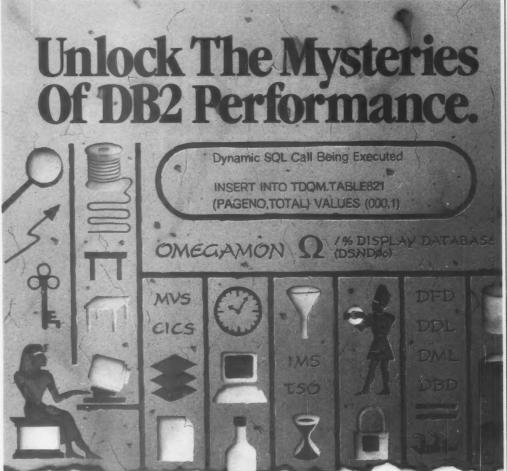
But there was something a bit odd about that PR/SM announcement. IBM said that while PR/SM could offer a user with a 3090 E or S model running VM/XA as many as six guests, MVS users must have a medium- to high-powered S model to get those six partitions.

Why? I asked.

On the powerful S models, there is a slightly different PR/SM than the one on the low-end S models and E models. However, VM/XA can make either version of PR/SM create up to 6 partitions. Without VM/XA, the lesser PR/SMs can yield only four partitions. Is there a technological problem here, some kind of PR/SM barrier?

Not really, I was told. The decision to offer the amounts of PR/SM partitions on some S models but not on others was based on "customer demand." Users of the lower powered S models and all E models under MVS didn't seem to need PR/SM partitions in large quantities. If demand existed, there is no immediate reason why more partitions could not be offered, they said.

How about 3090 E model and low-end 3090 S users with VM/XA — the demand must be there, right?

Well, no, I was told. Few users of those low-end machines would want a lot of PR/SM par-

X/Open
FROM PAGE 25

edly planning to specify the CAE in a forthcoming procurement for $1 billion to $2 billion worth of Unix minicomputers.

The X/Open CAE, which is an integrated set of de facto, international computer standards, was endorsed by administrative agencies in Sweden and West Germany, the UK's Central Computer and Telecommunications Agency (CCTA) and the Commission of the European Communities (CEC).

Lisa Waxman, X/Open's director of market development, said the benefit for government agencies is that by specifying CAE they will ensure that their applications software will run on any CAE-compliant hardware.

The U.S. government's National Institute of Standards and Technology is working closely with X/Open, and its forthcoming Applications Portability Profile is likely to have a "90% over-

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titions, but IBM was offering them anyway.

So why not offer the same PR/SM option for MVS users? Good question.

Also, if it is true that only high-end users need more PR/SM partitions, then why can a 200S user under MVS get six partitions per side, but an MVS user of a 600E, which is more powerful than the 200S, only get four per side?

Unless, of course, IBM is attempting to steer customers to the new, more powerful S models by making sure they have a richer inventory of features than the E models.

Also, if you could partition an MVS-based mainframe to increase its capacity in handling applications, there might be less need to buy a whole new system. And this is the fourth quarter of the year, a time in which IBM traditionally wants to sell as many computers as possible.

This is just a guess, and probably the fruit of a devious mind, but could it have cost IBM more time and trouble to prevent a full six partitions from being available to E model and low-end S model users under MVS than it would to have allowed them those partitions?

When pressed, one official said IBM wants to be flexible on the whole question. "If a 3090 600S buyer said he would buy the machine if he could get eight partitions per side, we would try to give him that."

If you're a user and more partitions could help you solve your applications backlog, PR/SM may bear further investigation. The bottom line may be this: Ask and you shall receive.

Gibson is Computerworld's *senior editor, software.*

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lap with CAE," Waxman said.

Government and military agencies were first to recognize the benefits of open systems and CAE, X/Open officials said.

In West Germany, the German Postal Service has already awarded a systems contract specifying the X/Open CAE, and the UK's CCTA has announced two procurements that must comply with CAE, according to

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X/Open officials.
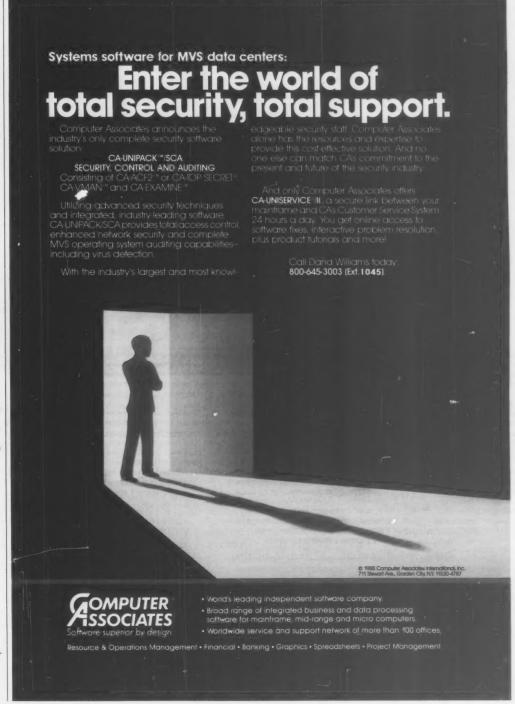
The CCTA predicted its installed base of computers will grow from 80,000 to 230,000 over the next five years and that nearly 20% of the inventory will run the Unix operating system.

The CEC, the administrative body for the 12 member states of the European Parliament, has included CAE as a key component in its architecture for a pan-Eu-

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ropean computer network, officials said.

"This Common Applications Environment will become more important than Unix, as it will open up the software market. Independent software vendors with good ideas will at last find an open market," said W. De Backer, chief of information technology for the CEC, in a written statement.

Also, a working group of the North Atlantic Treaty Organization is studying the prospect of using CAE or the Applications Portability Profile in its long-range systems strategy, according to Lt. Col. Jerry Johnson.

Vendors in the X/Open consortium include IBM, AT&T, Digital Equipment Corp., Unisys Corp., International Computers Ltd. and Sun Microsystems, Inc.

Unix

vendor announcements is that as Unix becomes increasingly standardized, vendors look for ways to gain competitive advantage. "Security is one of those differentiators," he said.

Apollo, based in Chelmsford, Mass., has a secure Unix operating system under evaluation by the National Computer Security Center and expects a C-2 rating, Musick said.

Sun Federal, a subsidiary based in Mountain View, Calif., began the latest round of announcements on Oct. 17 when it introduced SunOS Multi-Level Secure, a Unix operating system with multilevel security for the Sun-3 and Sun-4 workstations. The operating system, currently under evaluation by the National Computer Security Center for a B-1 rating, will be available in June 1989 and is priced at $3,000 per workstation.

Last week, Sun Federal added a Tempest version of the Sun-3 workstations, with prices start-

> "**S**ECURITY is one of those differentiators."
>
> LEE MUSICK
> APOLLO

ing at $22,900. Tempest systems are shielded to prevent electronic emissions.

"We're trying to solidify our position in the intelligence field," explained Larry Hambly, president of Sun Federal, which supplies workstations to agencies such as the NSA.

Harris' Computer Systems Divison, based in Ft. Lauderdale, Fla., introduced CX/SX, a secure Unix that is said to offer B-1 level security on Harris' supermicros and superminis. The offering, developed jointly with AT&T Federal Systems, is under evaluation by the National Computer Security Center.

William J. Marlow, director of aerospace and defense at Harris, claimed that the security features in CX/SX cause performance degradation of only 5%, compared with 20% to 40% for competing secure systems.

CX/SX, available in June 1989, will cost roughly $25,000 to $100,000, depending on the number of processors and other factors, Marlow said.

Gould, Inc., based in Ft. Lauderdale, has the only secure Unix, UTX/32S, that has been fully certified at the C-2 level, and the company is planning to announce a B-level product before the end of the year, a spokesman said.

Tim Reid, industry marketing manager for Gould's Computer Systems Division, expects the

market for secure Unix to take off in 1990. By then, he said, agencies will feel comfortable that there are multiple vendors with mature technology, and they will be facing the 1992 mandate for C-2 systems.

The move toward secure Unix systems was highlighted by several other developments:
• The Santa Cruz Operation, Inc., based in Santa Cruz, Calif., said the next version of its SCO Unix System V/386 will have C-2 level security. Release 3.2, available in first-quarter 1989, will be jointly developed with Secureware, Inc. of Atlanta.
• Computer Consoles, Inc. in Irvine, Calif., said the next release of its Unix operating system for office automation systems will have C-2 level features.
• X/Open Co., an international
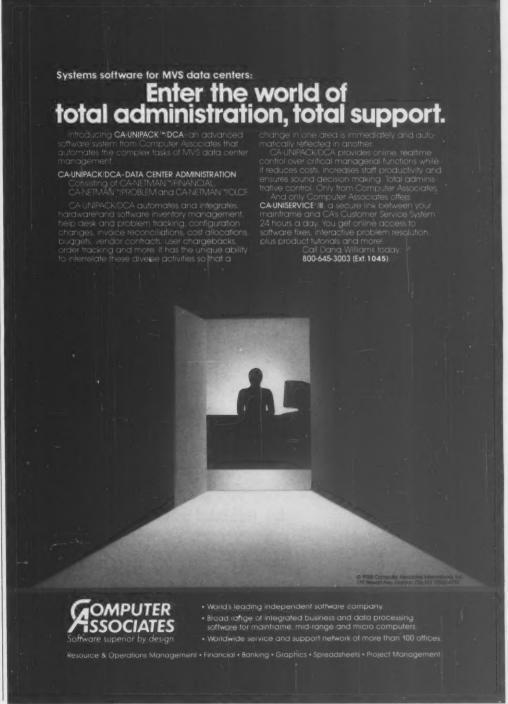
computer standards consortium, last week published a security guide for Unix. Lisa M. Waxman, director of market development, said the guide pulls together the existing and sometimes little-known security features already in Unix.
• AT&T's next release of Unix System V is expected to have C-2 level security, according to Gary Bowen, vice-president of

marketing for Concurrent Computer Corp. in Westford, Mass. Bowen said Concurrent — which does 55% of its business with the federal government — will adopt AT&T's system.
• Biin, the joint venture by Intel Corp. and Siemens AG located in Hillsboro, Ore., recently announced a secure operating system that has a Unix interface [CW, Oct. 17].

Beta users

terface is different from the Microvax II interface in that it limits their ability to employ high-capacity, third-party storage products.

"We could put in a Dialog controller and a Maxtor disk drive on a Microvax II and have 600M bytes on a disk, but with the DSSI we don't have that option," said Max Egenhofer, a research assistant at the University of Maine, who has used a 3400 for five months.

DEC officials said that third-party producers may have to adapt their storage products to the interface but added that the implementation of DSSI is part of the company's continuing plan to incorporate higher end functionality into smaller and less expensive systems.

Other users said they were concerned about the limitations of the 300M bytes of storage the 3400 offers. "The 3600 is still a lot more expandable in terms of disk

space and memory," Baldridge said, "and it would be very difficult for us to do what we need to do with a raft of 3400s, simply because they lack the disk space."

In recent weeks, DEC has guarded against the possibility that the processing speed of the 3300 and 3400 — which DEC claims offer 2½ to three times the performance of a Microvax II — will present a more attractive price/performance alternative to users than the 3500 and 3600 by souping up the higher models.

The Maynard, Mass., company has announced that it will double the addressable memory on the 3500 to 64M bytes early next year and increase the machine's Q-bus expansion slots from 12 to 22.

Additionally, DEC has announced an

"**T**HE 3600 IS still a lot more expandable in terms of disk space and memory, and it would be very difficult for us to do what we need to do with a raft of 3400s, simply because they lack the disk space."

NEIL BALDRIDGE
COMPU-SHARE

expansion enclosure for the 3500 that allows for the addition of two more RA70 disk drives. "Obviously, we want to keep the upper end of the line as robust as possible," a DEC spokesman said.

Still, the price differential between the models remains extreme: The 3400 sells for $53,950, while a user must fork over

nearly $100,000 for a 3600.

Egenhofer also said he thinks that DEC's choice of the TK70 296M-byte streaming tape drive subsystem for the new machines was a mistake.

"It's unreliable and slow; definitely one of the worst products DEC ever introduced," he said.

Hamilton

dent about its image systems strategy. When asked what the IBM approach is, Dave Liddell, manager of marketing plans for image application systems at IBM, said, "We didn't build an image product. We built image into our product line."

IBM says that while other vendors can only offer hooks into the IBM world, only IBM will be offering a system that uses its DB2 and is built with the basic building blocks of IBM's Systems Application Architecture. The image system's storage devices will eventually be managed by the system-managed storage component of the IBM MVS/ESA operating system.

For those large data processing shops with already-strong IBM commitments, that is a big plus. Among other things, an IBM choice would give them a standard approach to the management of image and data.

But for other shops, an image system that is a fundamental part of the IBM world will not be a requirement. Some sites will use image systems as stand-alone systems, functioning like an electronic file cabinet. Still others will be satisfied with links into the IBM mainframe environment, a level of integration that is available from other vendors now.

Wang officials claim that many users need image systems now and that IBM's fancy talk on building blocks and DB2 isn't going to help. Wang further claims that IBM has been aggressively promoting its image system plans because it is concerned about the advances Wang has made in traditional IBM accounts. Wang says it has made 120 sales.

IBM says it has talked about its image system plans ahead of releasing a product because it wants to help users plan for the future.

This point/counterpoint routine isn't worth much at all to users. But this competition has given them a choice. The user needs only to look to his own requirements and ignore the vendors' verbal sparring.

Hamilton is Computerworld's *senior editor, systems.*

One solution to three

The new IBM PS/2 Model 30 286.

NEW PRODUCTS — SOFTWARE

System software

Sun Microsystems, Inc. has introduced SunOS Multi-Level Secure (MLS), a Unix operating system designed to provide secure computing in an open-systems environment.

SunOS MLS runs on Sun-3 and Sun-4 platforms. The operating system is an extension of SunOS, which is a convergence of AT&T's Unix System V and the University of California at Berkeley's Unix, the vendor said.

SunOS MLS costs $3,500 per workstation for a two-user license.

Sun, 2550 Garcia Ave., Mountain View, Calif. 94043. 415-960-1300.

Sas Institute, Inc. has revised its Sas System Under VMS for Digital Equipment Corp.'s VAX platforms.

Release 5.18 will reduce CPU demand through significant performance improvements in SAS data set I/O and in processing raw data files, according to the vendor. The product has also enhanced support for larger production job environments.

The Sas System Under VMS Release 5.18 is licensed on an annual basis with renewals available at lower rates. The first-year license fee for basic Sas software ranges from $700 to $10,000, depending on machine classification.

Sas Institute, Box 8000, Sas Circle, Cary, N.C. 27512. 919-467-8000.

Development tools

Progress Software Corp. has introduced a front-end productivity tool designed for DOS-based The Santa Cruz Operation, Inc. SCO Xenix 286- and 386-based NCR Corp. Towers machines and Sun Microsystems, Inc. machines.

Called Fast Track, the menu-driven application builder is used with the vendor's fourth-generation language (4GL) relational database management system package. It includes a report writer, screen painter and menu editor.

Pricing for the Progress Application Development System, including Fast Track and the 4GL DBMS, ranges from $1,450 to $154,000.

Progress Software, 5 Oak Park, Bedford, Mass. 01730. 617-275-4500.

I-Logix, Inc. has expanded its line of Statemate real-time systems engineering tools. Designed for Ada environments, the products are available for workstations from Sun Microsystems, Inc. and Apollo Computer, Inc. as well as Digital Equipment Corp. Microvaxes.

The Statemate Prototyper is said to automatically generate Ada code directly from Statemate system specifications. It costs $25,000 per user. The Statemate Documentor is an automatic documentation package with the U.S. Department of Defense 2167A templates and costs $15,000 per user, the vendor said.

I-Logix, 22 Third Ave., Burlington, Mass. 01803. 617-272-8090.

Applications packages

Abraxas Software International has announced that its Athena line of accounting software, written for fourth-generation language environments, is now operable on 33 different hardware platforms.

The Athena Wholesale Distribution and Accounting System consists of six modules, including general ledger, accounts payable, accounts receivable, inventory management and customer order processing and shipping, as well as purchase orders and receiving. All six reportedly operate on AT&T, IBM, Digital Equipment Corp., Data General Corp., Hewlett-Packard Co., NCR Corp., Unisys Corp., Altos Computer Systems, Inc. and 25 other hardware systems using the Unix or Xenix operating systems.

The system is priced from $5,376 to $59,136, depending on operating system and hardware platform.

Abraxas Software, Suite 202, 1530 Third St., Lincoln, Calif. 95648. 916-645-7727.

Global Software, Inc. has announced Release 3.0 of its Accounts Receivable and Credit Management System (ARCMS) for the IBM System/38. According to the company, the software is also fully functional with the IBM Application System/400 mid-range computer series.

Features reportedly include standard chargeback notice, cash tolerance, terms-code expansion and credit-inquiry screen functions. A dual-period accounting facility has been added that permits users to post cash or perform journal entries for the next accounting period without having to close account records for the current period.

ARCMS 3.0 is priced from $30,000 to $40,000, depending on configuration.

Global Software, 1009 Spring Forest Road, Raleigh, N.C. 27615. 800-366-7890.

Peripheral Software Concepts, Inc., a supplier of automated data collection and shop-floor management systems for the manufacturing industry, has introduced its **Striped Lightning** product line for use on Hewlett-Packard Co.'s Spectrum series of computers.

The software reportedly features a set of real-time data collection modules that include time and attendance reporting, shop floor labor collection and reporting, pre-payroll processing, security access control and detailed serial number and lot tracking.

A work-in-process material-control facility is also provided.

Striped Lightning is priced from $30,000 to $70,000, depending on configuration.

Peripheral Software, 600 Johnson Ave., Bohemia, N.Y. 11716. 516-563-7000.

A mainframe-based documentation software package that operates in an IBM CICS environment has been announced by **Napersoft, Inc.**

Called **Naper-Doc,** the software is said to work in conjunction with the company's Naper-Word mainframe word processing package to automatically prepare and maintain documentation, manuals, books and reports.

The product will automatically produce a table of contents, a list of appendices and figures and an index, according to the company.

Naper-Doc is priced from $3,000 to $7,500, depending on hardware configuration.

Napersoft, 1 Energy Center, Naperville, Ill. 60540. 312-420-1515.

J&KH Software has released a Unix-based software publishing package.

According to the company, **PStext-plus** does not require knowledge of typesetting terminology or special terminals, so it is available to all users on the system. Features include automatic correction of misalignments, spreadsheet compression, automatic calculation and extensive merging capabilities. The product is currently available for AT&T, Harris Corp. and Unisys Corp. Unix engines. It supports a variety of spooled Adobe Systems, Inc. Postscript printers.

PStext-plus is priced from $1,495 to $4,995, depending on configuration.

J&KH Software, 4911 S. 31st St., Arlington, Va. 22206. 301-294-0515.

A menu-driven management system designed for maintenance departments with little or no computer expertise has been announced by **J B Systems, Inc.**

The software, called **Mainsaver/400,** was designed to run on IBM's Application System/400 series of minicomputers. Six modules are included: Work Order, Budget, Maintenance History, Inventory, Purchase Order and Preventive Maintenance. The product also provides a relational database and a monthly report-generation facility.

Mainsaver/400 is priced from $18,000.

J B Systems, Suite 640, 21600 Oxnard St., Woodland Hills, Calif. 91367. 818-340-9430.

A word processing package for Pick Systems, Inc. Pick-based computers has been introduced by **Aurotech, Inc.**

Called **Aurotext,** the product reportedly runs on Applied Digital Data Systems, Inc.'s ADDS 1700 and 6000 series and Altos Computer Systems' 3068 Pick systems. Most of the system is written in Basic, and the software allows the user to display and edit two documents at the same time, the vendor said.

The product is shipped with the system tape, cartridge or diskette, a keyboard template, an installation guide, a program tutorial and a reference manual.

Aurotext costs $395.

Aurotech, Suite 900, 5445 DTC Pkwy., Englewood, Colo. 80111. 303-770-5004.

MacNeal Schwendler Corp. has expanded its family of software products designed for electromagnetic analysis.

Three programs are now offered: **MSC/Magnetic** for two-dimensional analysis on workstations and mainframes; **MSC/Maggie** for 2-D analysis on IBM Personal Computers; and **MSC/Magnum** for three-dimensional analysis on mainframes and supercomputers. The software runs on several hardware platforms, including machines from Apollo Computer, Inc., Convex Computer Corp., Cray Research, Inc., Digital Equipment Corp. and Floating Point Systems, Inc. The programs also run on IBM Personal Computers.

MSC/Magnetics is available for monthly leasing; fees range from $800 to $1,500 per month. MSC/Magnum is also available on a monthly lease basis, with prices ranging from $1,000 to $2,500. MSC/Maggie, the PC-based product, can be leased for $200 per month or purchased for $5,000.

MacNeal Schwendler, 815 Colorado Blvd., Los Angeles, Calif. 90041. 213-258-9111.

Utilities

Optima Software, Inc. has announced the availability of **Change Man,** an automated library change and configuration management system.

The product automates the migration of software changes from testing through the production stage while ensuring the relationship between the source code and executable modules.

The software also handles JCL, COPY, database control files and documentation. The system runs under IBM's TSO/ISPF and provides on-line capabilities for verification and approval of changes.

Change Man is priced per site, depending on configuration. Pricing for the sys-

tem starts at $20,000.

Optima, Suite 300, 1010 Hurley Way, Sacramento, Calif. 95825. 916-646-3800.

A dynamic buffer-allocation expert software has been introduced by **Goal Systems International, Inc.**

Called **Hyper-Buf,** the product offers significant improvement in VSAM batch processing time, the vendor said.

The software is said to automatically allocate buffer space for VSAM files under IBM's VSE, MVS and CICS. It will intercept VSAM OPENs and dynamically allocate I/O buffers based on the access-type storage available at the time of OPEN and user-defined rules.

Hyper-Buf supports VSE 1.3.5 and

above and all releases of MVS/SP, MVS/XA and CICS 1.5 and above, according to the vendor.

Permanent licenses cost from $4,500 to $11,000, depending on operating system and CPU size.

Goal Systems, 7965 N. High St., Columbus, Ohio 43235. 800-848-4640.

Programart has announced the general availability of its **Strobe** application tuning product for use in IBM's MVS/ESA environment.

According to the vendor, the Strobe Performance Measurement System quantifies performance gains attributable to the use of data spaces, hyperspaces, data windowing and the Virtual and Library Lookaside facilities within

MVS/ESA. The user can tune applications operating in batch, CICS, IMS/DC or TSO environments, as well as those using VSAM, IMS/DB, DB2 and other database facilities.

Strobe for MVS/ESA is priced from $29,900.

Programart, 1280 Massachusetts Ave., Cambridge, Mass. 02138. 617-661-3020.

Viewlogic Systems, Inc. has ported its mixed analog and digital simulator to Sun Microsystems, Inc. Unix-based machines.

Called **Viewsim/AD,** the product was co-engineered by Viewlogic and Microsim Corp., a Laguna Hills, Calif.-based company.

The system simulates designs by combining analog and digital functionality as tasks under Sun Unix-based or Digital Equipment Corp. VAX/VMS operating systems.

Viewsim/AD runs under a proprietary multiwindowing environment, and both versions are said to support existing digital- and analog-device libraries.

Viewsim/AD for the Sun-3 workstation costs $25,000.

Viewlogic, 313 Boston Post Road W., Marlboro, Mass. 01752. 508-480-0881.

Microsystems Engineering Corp. has introduced the **Mass-11 Graphics Processor Version 5.0** for Digital Equipment Corp. VAX computers.

The latest update of this graphics translator gives users the option of either integrating Tektronix, Inc. files into a Mass-11 Word Processing document or outputting them directly to a variety of laser printers, according to the company.

The Mass-11 Graphics Processor Version 5.0 is priced from $995 for the Vaxstation to $5,750 for the VAX 8500 series, including the 6200 models, the company said.

Microsystems Engineering, Suite 400, 2400 W. Hassell Road, Hoffman Estates, Ill. 60195. 312-882-0111.

New at Unix Expo '88

The following software products were announced at Unix Expo '88 in New York:

Statware, Inc. introduced an integrated data analysis package that runs on a variety of Unix-based systems. Called **Statit,** the graphical and statistical software package includes a quality control module that incorporates industry-standard statistical process-control charts, the vendor said.

The five-module system is priced from $1,350, depending on hardware configuration.

Statware, Suite 109, 260 S.W. Madison Ave., Corvallis, Ore. 97333. 503-753-5382.

Verity, Inc. announced the availability of a full-text retrieval software system developed specifically for Pyramid Technology Corp.'s Series 9000 family of Unix-based computers. According to the vendor, **Topic** was designed specifically for client/server networks, and the product is capable of retrieving any document available on a network regardless of format.

Topic is priced from $12,500 to $40,000.

Verity, 1500 Plymouth, Mountain View, Calif. 94043. 415-960-7600.

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All good reasons to call **1-800-752-0900, Ext. 297A** for the name of your nearest dealer.

HEWLETT PACKARD

NEW PRODUCTS — SYSTEMS

Processors

Houston Computer Services, Inc. announced a multichannel communications processor unit (MCPU) expansion board designed for Texas Instruments, Inc.'s Business System Computers.

Designated the **MCPU/212**, the product is said to be a full-slot printed circuit board that allows 12 terminals to connect to a single slot in the TI business system chassis via RJ11 telephone-style connectors.

The MCPU/212 board costs $2,195. Quantity discounts are available.

Houston Computer Services, Suite 200, 11001 S. Wilcrest, Houston, Texas 77099. 713-568-9900.

Itek Graphix Corp. Composition Systems Division has introduced a text and graphics workstation that was developed for desktop publishing environments.

The **Designitek** workstation is said to incorporate a Sun Microsystems, Inc. 386I workstation, the Unix operating system and a proprietary 1,600 dot/in. image setter. Features include interactive what-you-see-is-what-you-get displays, as well as ruling, tabular and graphics functions.

The complete Designtek system is priced at less than $70,000.

Itek Graphix, 34 Cellu Drive, Nashua, N.H. 03063. 603-889-1400.

Data storage

A cartridge tape subsystem for IBM and compatible mainframes has been announced by **First Alliance Software and Technologies, Inc.**

The **Fast A480** subsystem is reported to be fully format- and media-compatible with the IBM 3480 cartridge tape. The unit is offered in three different drive and controller configurations and offers data transfer rates ranging from 1.5M to 3M byte/sec., depending on the channel selected. Local and remote diagnostic capabilities are included.

The Fast A480 is priced from $54,870 to $136,610, depending on configuration purchased.

First Alliance Software and Technologies, 11770 Bernardo Plaza Court, San Diego, Calif. 92128. 619-487-8030.

A tape subsystem that offers 2.2G bytes of automatic data backup for the AT&T 3B, NCR Corp. Tower, and Unisys Corp. U Series of computers is available from **Feith Systems and Software, Inc.**

Called **Tinytape**, the 8mm magnetic cartridge is shipped with error-correction software and small computer system interface (SCSI) functions. The two-bay cabinet also contains an internal power supply, SCSI pin connectors and cable.

A complete Tinytape system costs $10,000.

Feith Systems and Software, 1 Bala Plaza, East Lobby, Bala Cynwyd, Pa. 19004. 215-667-5575.

Systems Industries, Inc. has introduced a trio of tape drive subsystems developed to support Digital Equipment Corp. HSC50 and HSC70 controllers.

The 9-track **SI2200** features 200 in./sec. capability and offers a 1.25M bit/sec. data transfer rate. The **SI2100** provides 100 in./sec. streaming capability

and was designed for disk data backup and data distribution applications. Both include tape transport, formatter/controller, power supply and resident diagnostics.

The 8mm **SI2046** powerpack tape cartridge system is said to connect directly with the HSC series; it provides backup of 4.6G or 9.2G bytes of information without operator intervention.

The SI2200 is priced from $55,000, the SI2100 costs from $30,000 and the SI2046 ranges from $28,000 to $50,000.

Systems Industries, 560 Cottonwood Drive, Milpitas, Calif. 95035. 408-432-1212.

Summus' helical-scan tape

Summus Computer Systems has announced an 8mm, helical-scan tape with disk. The subsystem was developed specifically for Digital Equipment Corp. PDP, VAX and Microvax computers, according

to the vendor.

The **Sum 14205** reportedly provides more than 2G bytes of formatted tape capacity and 760M bytes of disk storage.

The desktop unit is priced at $13,985.

Summus Computer Systems, P.O. Box 219270, Houston, Texas 77218. 800-255-9638.

I/O devices

Decision Data Computer Corp. has announced two matrix line printers developed for use with IBM mid-range computer systems, including the Application System/400 series.

Designated the **6709** and the **6711**, both units offer IBM 5225 emulation and

diagnostic functions. The 6709 reportedly provides a draft mode speed of 1,200 line/min and is priced at $13,500. The 6711 performs at 1,400 line/min in draft mode and costs $15,500. Seven resident fonts are supplied with each printer.

Decision Data, 400 Horsham Road, Horsham, Pa. 19044. 215-956-5728.

Toshiba America's Information Systems Division has introduced a 24-pin letter-quality printer, **Expresswriter 311.**
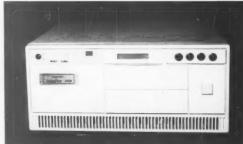
The dot matrix device offers three resident emulations, 16K bytes of buffer and a mean-time-between-failure rate of 4,200 hours, the vendor said. Letter-quality printing is provided at 60 char./sec. and 180 char./sec. in high-speed draft mode.

The Expresswriter 311 is scheduled for shipment this month and is priced at $589, the vendor said.

Toshiba America, Information Systems Division, 9740 Irvine Blvd., Irvine, Calif. 92718. 714-583-3000.

A combination hardware/software product that acts as a translator and spooler has been announced by **Grafixland.**

The **Transplot 1000** was designed to eliminate incompati-

Grafixland's *Transplot 1000 translator/spooler*

bility between software drivers, hardware controllers and various peripherals. The system also provides a means for spooling large files to local-area networks and small personal computer systems, the company said.

A basic configuration consists of one translator, 10M bytes of spooling and two ports. The price is $2,500.

Grafixland, 8136 Orion Ave., Van Nuys, Calif. 91406. 818-376-0065.

A general-purpose VDT that offers a touch-screen user interface as well as a keyboard has been announced by **Applied Digital Data Systems, Inc.**

The **2020 Touch Terminal** reportedly provides a 14-in. non-

glare flat-faced CRT and is available in green, amber or white. The terminal is priced at $1,595 and is primarily targeted at value-added resellers.

Applied Digital Data Systems, Display Products Division, 100 Marcus Blvd., Hauppauge, N.Y. 11788. 516-231-5400.

Power supplies

A low-cost powerline monitor is now available from **Dranetz Technologies, Inc.**

Designated the **Model 646-1**, the 11-pound unit monitors sags, surges, impulses and frequency changes from single-phase and neutral-to-ground installations. It costs $3,000, with optional built-in modem and un-

interruptible power supply.

Dranetz Technologies, CN-91, 1000 New Durham Road, Edison, N.J. 08818. 201-287-3680.

Controlled Power Co. has introduced an uninterruptible power supply with a direct interface to the IBM Application System/400 mid-range computer. The **Series 1000 Model UP-400 D** is available in 6-, 12- and 18-kVA models and offers 10-min. power supply backup.

A complete 6-KVA UP-400 D package for the IBM B30, including a power warning feature and 15 ft of cable, lists at $9,189.

Controlled Power, 1955 Stephenson Highway, Troy, Mich. 48083. 800-521-4792.

Pioneer Magnetics, Inc. has announced the **Model 2588** AC/DC switching power supply.

The unit reportedly provides 1.5K watts of power in a standard 5- by 8- by 15-in. case and is targeted to telecommunications and computer-system applications. It features multiple output channels and delivers 5 V and up to 240 amps in the main channel. The 2588 costs $1,495 in single quantities.

Pioneer Magnetics, 1745 Berkeley St., Santa Monica, Calif. 90404. 800-233-1745.

New at Unix Expo '88

These products were announced at Unix Expo'88 in New York:

A multiuser Xenix board designed for IBM Personal System/2 computers was unveiled by **Comtrol Corp.** The **Ultra 186/MC** was developed to offload the system CPU and free it for other tasks. It lists for $1,395.
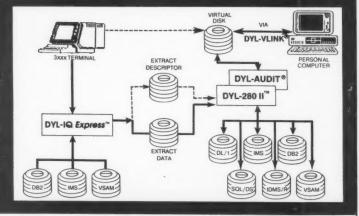
Comtrol, P.O. Box 64750, St. Paul, Minn. 55164. 800-333-1033.

MAD Intelligent Systems, Inc. demonstrated the **Smart Data System,** which reportedly offers concurrent access to major Unix relational databases across heterogenous computer networks.

The Series 5000 Database Server is an 80386-based 25-MHz machine. The Madaccess SQL integrator provides transparent-access interfaces to several relational databases. The Series 5000 is priced from $25,000 to $200,000. Madaccess ranges from $8,000 to $50,000 per copy.

MAD, 2950 Zanker Road, San Jose, Calif. 95134. 408-943-1711.

MICROCOMPUTING

Pretty pricey

You wanna buy what? If you listen to the vendors, everyone is going to want at least an Intel 386, a high-resolution monitor and scads of random-access memory to multitask with IBM and Microsoft's OS/2 Presentation Manager. Based on a quick calculation, we could be talking an easy $7,000 to $10,000 to plunk all this on someone's desk, never mind training and support. The U.S. economy may be doing well so far, but not that well.

The problem for MIS will be to decide who deserves this kind of system. Cost-justifying Presentation Manager, when an IBM Personal Computer XT or AT clone is doing just fine, will be darn near impossible. Most folks use a PC for simple tasks and have already learned the key software packages.

For highly paid or highly technical employees, cost-justification has always been simple. The employees' time is worth a lot of money, and any ounce of extra productivity is worth the thousands of dollars it costs to get it.

But for others, the speed of the PC or the graphics or the

PCs replace pencils at Hughes

Computer classes spark interest throughout aircraft maker's plant

BY JULIE PITTA
CW STAFF

FULLERTON, Calif. — When executive secretaries are asked to trade in their trusty typewriters for Apple Computer, Inc. Macintosh personal computers, some are likely to balk at the change.

But not Joanne Peterson, an executive secretary at Hughes Aircraft Co.'s Ground Systems Group. She simply signed up for an introductory Macintosh class offered by her company.

Today, Peterson is comfortable with her Macintosh, and her boss, who also works on a Mac, is pleased with the change. Now, they can pass disks back and forth and, with a few quick keystrokes, make alterations on each other's work, which might have taken more than twice the time with a typewriter.

"I like working on the Mac; it's fun," Peterson said. "If I run into any trouble, the trainers are right down the hall."

To some, a large defense contractor like Hughes Aircraft

seems an unlikely setting for a miniature university. But hidden in the large Fullerton complex is a computer learning center that offers a variety of services for a wide range of users.

Not all the users are beginners. Tim Gantt, a management systems specialist, uses the learning center's demonstration room to convert 5¼-in. disks used on his home PC to 3½-in. disks used on the IBM Personal System/2 that he has in his office.

Look out for Private Eye

BY MICHAEL ALEXANDER
CW STAFF

CAMBRIDGE, Mass. — Reflection Technology, Inc. will unveil at Comdex/Fall '88 next week a miniature display for laptop computers, calculators and other portable electronic devices.
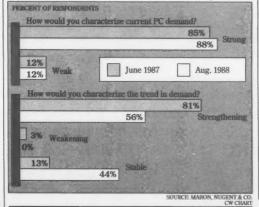
Dubbed the Private Eye, the display weighs less than two ounces and is small enough — measuring at 1.1 by 1.2 by 3.2 in. — to be mounted on a headset. The display is positioned in

---

Data View
Steady as she goes

Surveys of 100 PC dealers reveal a continued healthy demand in a stabilizing market

PERCENT OF RESPONDENTS

How would you characterize current PC demand?

- 85% Strong
- 88% Strong
- 12% Weak
- 12% Weak

☐ June 1987 ☐ Aug. 1988

How would you characterize the trend in demand?

- 81% Strengthening
- 56% Strengthening
- 3% Weakening
- 0% Weakening
- 13% Stable
- 44% Stable

SOURCE: MABON, NUGENT & CO.
CW CHART

End-user computing to have MIS repercussion

BY MICHAEL ALEXANDER
CW STAFF

TORONTO — The rise of end-user computing, as well as the spread of increasingly sophisticated personal computers, will have dramatic and far-reaching implications for MIS managers, said several speakers at the Managing End-User Computing for Greater Productivity and Profit conference held here last month.

In his keynote address to more than 40 information services managers representing a broad spectrum of organizations, Don Tapscott, director of end-user systems at the DMR Group,

Inc., a management consulting firm based in Toronto, noted that information technology is entering a new era.

An increase in computing power and the next generation of multimedia graphic interfaces

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Inside

- Micropro brings back Wordstar. Page 49.
- Frontline Systems beefs up analytical powers of Lotus' 1-2-3. Page 49.
- Scenario unleashes CD-ROM memory reader. Page 58.

Is it Safe?

North Africa...U.S. paratroopers on the way to their next mission. (Credit: International News Photos)

Would You Like to Know a Way to Make Risk-free Decisions About Buying Mainframe Software?

Buy from On-Line Software—the safe buy in mainframe software.

On-Line Software is "the safe buy" because it's the first and only company to offer you a lifetime guarantee that the money you spend with us today will still be available to meet your changing needs tomorrow.

No more waiting on vendors' promises for the ultimate solution—take advantage of today's technology today! IBM® and others may be addressing the "big picture" of tomorrow, but

IBM is a registered trademark of International Business Machines.

Compaq introduces
a revolutionary
new personal computer.
With new display technology.
Breakthrough graphics technology.
Advanced storage technology.
New expansion technology.
Innovative modem technology.
New keyboard technology.
New surface mount technology.
Advanced power supply technology.

And a battery.

Introducing the new
COMPAQ SLT/286 Personal Computer.
The first PC that puts true
desktop performance in your lap.

When you build a full
there's no room

Before now, choosing a laptop PC meant choosing what you could live without. A manageable size. Battery. Power. Speed. Screen quality. Full-size keys.

We've changed that, with the new COMPAQ SLT/286. It's the first laptop from the company that set the standard in portable computing. And the first laptop to give you everything you want. Without compromise.

Creating a new high-performance PC this small was no small feat. It took a series of engineering breakthroughs to build a smaller laptop that delivers the performance of a desktop—on battery power.

From its compact size to its high-performance components, you'll see that your needs shaped our thinking.

First of all, we knew you wanted to wield a lot of power, without throwing around a lot of weight.

The first laptop from the company that set the standard for portable PC's.

The new COMPAQ SLT/286 weighs in at just 14 lb., with a space-saving footprint. That means

The COMPAQ SLT/286 snaps into an optional Desktop Expansion Base for office use.

A removable keyboard offers your fingers full-size keys, with standard spacing.

it fits on an airline tray table with plenty of room to spare.

When you're on the road, we won't leave you stranded, either. The COMPAQ SLT/286 uses innovative new battery technology that gives you over three hours of power. The battery is small, so carrying a spare is no problem. Replacement and recharging are fast and easy.

But what's amazing about the battery is everything that runs on it. Every component is optimized to save battery life. So you can work longer.

The COMPAQ SLT/286 has VGA graphics with 640x480 resolution with eight shades of gray. New backlit screen technology produces text and graphics with higher contrast on a 10" diagonal screen. So things are easy to read.

Now let's take an inside look. The COMPAQ SLT/286 is powered by a 12-MHz

A small wonder. Compared to other laptops, the COMPAQ SLT/286 gives you more PC in less space.

It simply works better.

We have the world's best handle on portable computing.

In 1982 Compaq [...]
the world's first [...]
ble personal computer [...]
the COMPAQ Portable [...]

Since then [...]
edly delivered more [...]
performance, in ever [...]
smaller packages.

Today, we offer the [...]
highest-performing portable personal
computers. COMPAQ products consistently earn
the industry's highest ratings for quality and user

satisfaction. And that's an
achievement that stands
unchallenged.

You'll find that we've
built these same uncompro-
mising standards into the
new COMPAQ SLT/286.

To get a handle on more informa-
tion, including a free brochure and the location of
your nearest Authorized COMPAQ Computer
Dealer, call 1-800-231-0900. Ask for Operator 71.
In Canada, 1-800-263-5868, Operator 71.

COMPAQ

It simply works better.

REVIEWS/NEW PRODUCTS

Wordstar revival includes page preview

The revival of Wordstar, Micropro International Corp.'s classic word processing program, is awe-inspiring. Wordstar 4 offered added features and improvements. Wordstar 5 brings a competitive program that challenges the current champions.

Features: In addition to maintaining the original interface of control-key commands, Micropro has included an alternative interface of pull-down menus. You may switch back and forth at any time.

The program's most spectacular new feature is a page-preview system. You can view a full page, two facing pages, multiple pages and, on certain systems, up to 144 thumbnail pages.

You also get twofold and fourfold magnification that shows the page almost exactly as it will appear when printed, including specific fonts and proportional spacing. You can even put a 1-in. grid on the display.

Wordstar will optionally reformat text as you enter it, but a

change in ruler lines and margins does not automatically reformat existing text. Wordstar displays correct line and page breaks, even with proportionally spaced fonts.

Other enhancements include a not very well-integrated add-in outliner, PC-Outline from Brown Bag Software, a telecommunications program capable of all functions except for Kermit file transfers and a maillist utility that provides ready-made templates for an address file and inventory file.

It also offers the capability of sorting and maintaining up to 32 predefined sort sequences, with up to nine levels of sort per sequence. Profinder serves as an operating system shell, handling a host of tasks related to file management.

Wordstar 5 supports good block operations, and the calculator can handle trigonometric functions. Editing newspaper columns is reasonably effective, although they are displayed side by side for previewing, not edit-

Wordstar 5 is speedier than its predecessor

ing. Wordstar can handle up to eight newspaper-style columns, but they must be of the same width. All measurements are in inches.

There is no table of authorities function and no graphics commands. No support for alternative keyboards exists, and special characters must be entered by the clumsy ALT-plus-code-number method.

Performance: Poor to very good. Wordstar 5 has picked up a little speed, and Micropro has removed many of the hindrances to formatting and re-

formatting. The program now supports redefinable tabs, although it lacks right-justified and centered tabs. Hyphenation and some paragraph reformatting occur as you type. Most formatting commands are now automatically embedded in the document as dot commands.

Also new, two windows can be opened, and the number of lines in each window can be set. The status line sports new indicators including column number and inches from left margin, window number and justification flag.

The GOTO page has been expanded. Wordstar's mail merge now directly supports such file formats as Lotus Development Corp.'s WKS/WK1, Ashton-Tate Corp.'s Dbase II and III and its own format: standard comma-delimited files.

The spelling checker uses a dictionary of more than 100,000 words, and a spelling corrector can be installed. The thesaurus is built into the program. Index entry marking and table of contents generation remain much

Micropro's Wordstar 5.0

Price: $495

- Performance: Poor to very good
- Documentation: Very good
  - Ease of learning: Good
  - Ease of use: Very good
- Error handling: Very good
- Support: Poor to excellent
  - Value: Very good

the same as in Wordstar 4.

Footnotes, endnotes, nonprinting notes and annotations have been added.

Installation of fonts, selection and application is quite transparent, and the program includes a printer utility for editing fonts. Fonts are menu-selectable.

Wordstar still lacks style sheets, but 10 predefined rulers, called style guides, can be stored. There is also a utility that exists for creating a batch file to download fonts to a laser printer. Graphics integration does not really exist.

Wordstar 5 offers support only for ASCII translations, although it will import Wordstar files from previous versions and export Wordstar 4 files. The file inclusion capability for Lotus' 1-2-3 files is excellent.

1-2-3 gets analytic with Project Calc

Frontline Systems, Inc.'s add-in, Project Calc Version 1.10, enhances the analytical power of Lotus Development Corp.'s 1-2-3, Versions 2 and 2.01. Its unique approach to project management combines the generalized capabilities of 1-2-3 with specific project-control functions.

Features: Project Calc offers 30 project management functions within the familiar 1-2-3 environment. It attaches to 1-2-3 through Lotus' Add-In Manager, giving you instant access when 1-2-3 is running. It can also coexist with standard random-access memory-resident programs. A version for Lotus' Symphony is also available. Results generated by Project Calc are placed in a standard 1-2-3 worksheet.

One advantage of using Project Calc is its ability to include results in other models, such as adding individual task costs into

a departmental budget.

Project Calc is composed of two modules. One contains the actual project management functions; the other is a menu system that automatically creates formulas using the added computing power. You can load the functions module alone and create projects manually. Maximum project size is just over 2,000 activities.

Projects start as tables with task identifier, name, duration and relationship column headings. Project cells contain text, numbers or formulas. Resource costs, called assignments, occupy the fifth column.

Since you cannot enter a job classification or a name in this column, resource leveling is not possible.

Project Calc requires everyone to work according to one calendar. You control the number of work hours per day and indicate holidays and other time off. Tasks can be scheduled by the hour, day, week, month, quarter or

Menu system creates formulas

year. You can specify start and finish times, overlaps and lags between tasks.

Formulas occupy all but task identification and description columns of the basic input area. Graphics options display the schedule as Gantt or Program

Frontline Systems' Project Calc

Price: $150

- Performance: Good
- Documentation: Very good
- Ease of learning: Very good
  - Ease of use: Good
  - Error handling: Good
  - Support: Very good
  - Value: Very good

Beyond Basic: A plunge into development

True Basic, Inc.'s True Basic Version 2.03 departs from the de facto standard that has evolved from the program's roots. While the original language was designed as a tool to teach programming, this version aims at being a powerful application development tool. It follows the proposed ANSI standards for Full Basic.

Features: The maker of this language claims it is portable and that programs written in True Basic on an IBM Personal Computer will also run on an Apple Computer, Inc. Macintosh. On the whole, we found this to be true.

True Basic programs can be executed in one of two ways: You may run a program, which compiles it into intermediate "B code" and then interprets that, or you may compile your program into permanent B code, which is saved as a smaller file that executes more quickly. You can also produce a stand-alone application with the included

Run-Time True Basic program.
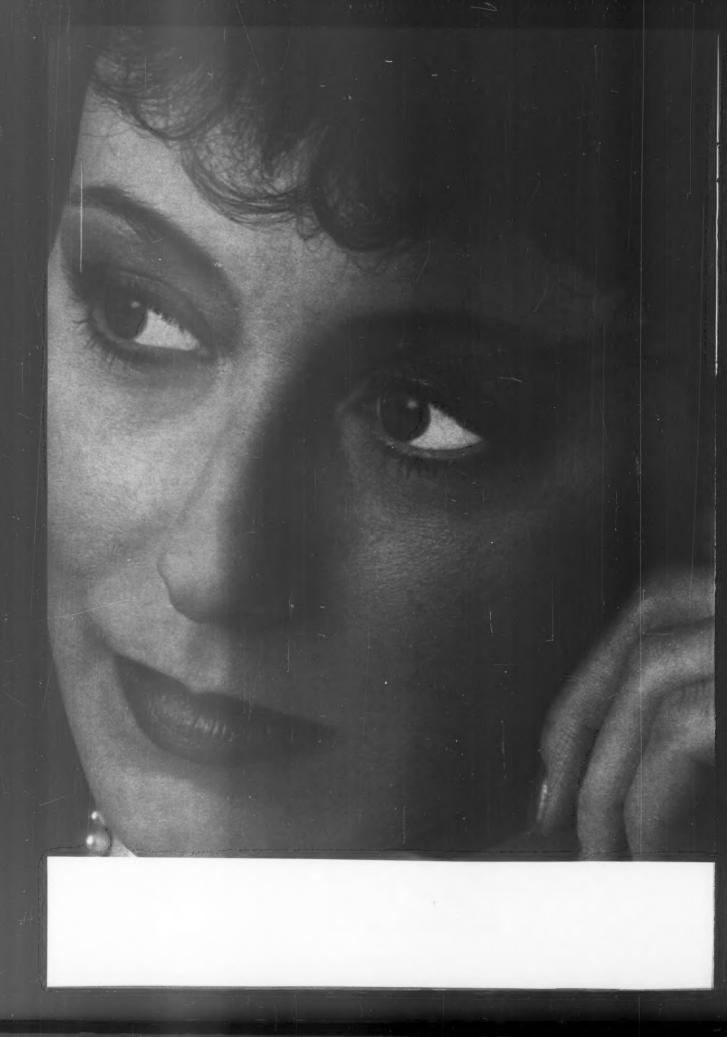
True Basic supports structured programming with new Select Case, nested if-then-else and DOLOOPS statements. Usually, subroutines and functions are executed by calling their names. If you want to use GOTO or GOSUB statements, you must add line numbers to each line in your program; True Basic does not support alphanumeric line labels.

True Basic handles graphics

True Basic Version 2.03

Price: $99.95

- Performance: Good
- Documentation: Satisfactory
  - Ease of learning: Good
  - Ease of use: Good
- Error handling: Satisfactory
- Support: Satisfactory to very good
  - Value: Satisfactory

"ISDN will allow us to get rid of our network spaghetti and concentrate on selling hamburgers."

McDonald's faced a challenge. They were spending too much time and resources maintaining 21 different communications networks, rather than on what they do best: selling hamburgers.

And McDonald's is growing at the rate of one new restaurant every 17 hours.

As Bonnie Kos, McDonald's V.P. for facilities and systems, put it, "We had to adapt a single approach to all our communications that not only got rid of all our network spaghetti, but allowed us easy connectivity and communications between computers that use different protocols."

The approach they chose was ISDN.

Ameritech's Illinois Bell, in conjunction with AT&T Network Systems, and using a 5ESS® switch, used ISDN to allow McDonald's to migrate to a single, integrated, all-digital network.

So now, McDonald's sends integrated voice and data over an ordinary telephone line. Turning every work station into an information center, while minimizing costs and gaining greater network control.

But, the advantages of ISDN go beyond simplifying and connecting McDonald's communications network.

ISDN will soon allow the company to access more current market data, quickly track product promotions, streamline inventory control and reduce administration workloads. All this means more time to spend one-on-one with the most important part of McDonald's business—the customer.

Even now, McDonald's is using such advanced ISDN features as calling number identification, electronic directory, and high-speed, high-quality facsimile transmission without dedicated lines.

As Bonnie Kos summed it up, "ISDN is letting us do a lot more with a lot less."

The Future's on the Line.

At AT&T, we believe that's where the future lies for every company—doing more with less. ISDN helps accomplish that today and helps pave the path to a larger vision: Universal Information Services—a world of services available on demand.

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AT&T
The right choice.

Wordstar

CONTINUED FROM PAGE 49

Documentation: Very good. Wordstar documentation covers the program and all of its add-ons, as well as printer information and tutorials.

One section of the documentation discusses applications using Wordstar, and a set of appendixes explores customizing. The index is good. On-line help is reasonably extensive, and error messages are informative.

Ease of learning: Good. Wordstar 5 requires a total of about 40 minutes to get up and running, depending on font- and printer-installation needs. To learn the basic functions through the tutorial takes as many as two hours for a reasonably computer-literate user. Experienced users who are familiar with older Wordstar versions will have no trouble learning the program at all.

Ease of use: Very good. Wordstar offers a host of customization options for changing the characteristics of the program to match the user's working environment.

Menus and help systems can be tailored to the amount of help needed, and the choice of menu and control-key interfaces is a big advantage.

Error handling: Very good. Wordstar uses a backup system that always preserves the most recently saved file as well as the file before it. A timed backup option is also available. The Undo command is one-level.

Support policies: Excellent. Technical support: Poor. Micropro offers a 90-day refund guarantee. Standard technical support is good for the life of the release plus six months. Toll-free support is available Monday through Friday from 7 a.m. to 4 p.m. Pacific Standard Time and Saturday through Sunday from 8 a.m. to 1 p.m.

We called technical support nine times in four days before connecting with a technician on a Sunday morning. When we were able to get through, we found technical support to be helpful and accommodating.

Value: Very good. For a price of $495, Wordstar 5 offers a strong complement of features, an exceptionally good

> W ORDSTAR 5 offers support only for ASCII translations, although it will import Wordstar files from previous versions and export Wordstar 4 files. The file inclusion capability for Lotus' 1-2-3 files is excellent.

print preview function, strong support for mail merge and telecommunications, an outliner and a host of other useful capabilities.

Project Calc

CONTINUED FROM PAGE 49

Evaluation and Review Technique, or PERT, charts. On-screen color graphics are not available. Shading sets apart task bars on the Gantt chart. Tabular reports can be generated.

All 1-2-3 commands can be used to sort reports, combine and print tables, compare reports in split windows and compare display attributes.

Performance: Good. Initially, you'll appreciate the simple, 1-2-3-style menu interface, but experienced 1-2-3 users will soon learn to bypass Project Calc's menu and construct tables using formulas.

You begin a project by checking the work calendar and entering a starting date. You enter a task and determine its duration. Menu assistance then lets you select the duration option. Each basic command category offers multiple functions with acceptable arguments. The menu system automatically interprets your response, selects the appropriate function and enters the formula.

Project Calc imposes few scheduling restrictions. Each task can have one scheduling constraint, one padding constraint and one precedence relationship with another task. Costs are accrued either at the start of the task, at the end or evenly throughout the task or project. Also, Project Calc assigns costs both as fixed amounts or by unit.

The project schedule is updated whenever 1-2-3 recalculates the worksheet. A delay of a few seconds to several minutes occurs whenever a change or new task is recorded. To avoid this, set recalculation to manual. Charts are generated almost instantly. Scrolling is slow.

Documentation: Very good. Project Calc's documentation is logical and clearly written. It covers installation using a sample application, menu selections, functions and error message descriptions, and it includes a glossary and index. On-line help is context-sensitive.

Ease of learning: Very good. Installation takes about 10 minutes. Any options previously set with 1-2-3's main install program remain intact.
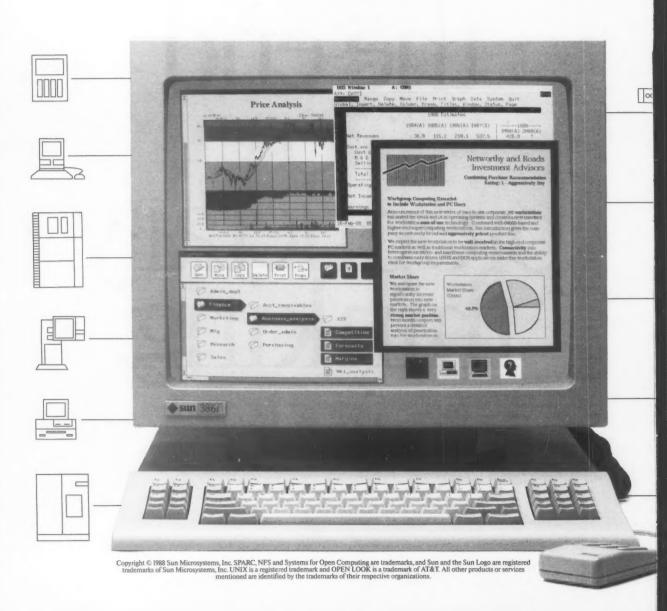
Project Calc assumes that its users have a working knowledge of 1-2-3. Even those with minimal project management experience can design a simple project in less than one hour.

Ease of use: Good. Although there are no resource management capabilities in this package and generating graphics is
Continued on page 56

Announcing the end to proprietary thinking.

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that's tru

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Open Computing.

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In other words, an entire corporate system that's totally open from top to bottom. And not one bit proprietary.

Now if all this sounds too good to be real, know simply this:

Open Computing is a proven reality that's already working in corporations today.

In point of fact, Sun has become a Fortune 500 company not by locking companies into proprietary systems, but by consistently providing open systems with a technological edge.

Find out more by calling (800) 223-6736, or in CA (800) 322-6736.

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Basic

in an innovative way. Instead of addressing pixels, you use the SET WINDOW command to establish your own coordinate system on your screen. Points, lines and areas are plotted in relation to this system. A minor problem is that different screens have different aspect ratios, so graphics may appear distorted when you port a program.

On the IBM PC, True Basic is presented in two windows: editing and history. You enter and edit source code in the editing window, and you enter commands like RUN and SAVE in the history window, which contains the Basic "OK" prompt.

On the Macintosh, the two windows — called Source and Command — can be moved and resized, but only the Command window can be closed. The menu bar on the Macintosh version duplicates many of the functions you can perform from the Command window.

The editor has no Search-and-Replace or Undo capabilities, but it will take care of block moves, copies and deletions. It does not do syntax checking.

Libraries of hyperbolic, trigonometric and mathematical functions, graphics and menu subroutines are included. Libraries — available at a price of $69.95 each — include a developer's tool kit, PC Basic conversion, Fortran conversion, communications support and various graphics extensions.

Performance: Good. The speed of the True Basic compiler is not impressive. The intermediate-compile and runtimes are slow. Also frustrating is the fact that the compiler will catch only five errors at a time. Although the structured environment of True Basic offers such advantages as more readable code and easier maintenance of programs, the conversion process is very difficult. True Basic will perform better with programs developed from scratch.

Documentation: Satisfactory. True Basic's documentation includes a reference manual, a machine-specific user's guide and a Version 2.0 supplement that covers new features. Finding the information you need is frustrating. The help files provide some assistance, but they are not context-sensitive.

Ease of learning: Good. True Basic's structured layout is logical and easy to teach. On the negative side is the documentation and insufficient conversion utility. An old Basic hack may find it difficult to learn its different implementation of many commands and statements.

Ease of use: Good. Having just two windows for editing and history and being able to scroll back to review what you have done is helpful. However, the simple interface also indicates a lack of power. Trace, Cross-Reference and Format are separate programs that must be run from the command prompt. More integration of the programming environment and a smart editor would make a big difference.

Error handling: Satisfactory. The program editor does no syntax checking by itself, although you can try most commands in the history window before adding them to your program. We do not know why it stops after it flags five errors.

The error messages are informative but do not refer to specific sections of the manuals. Nonetheless, when an error is found, you are returned to the editor at the offending statement.

Support: Satisfactory to very good. Technical support is available by telephone during East Coast business hours. True Basic does not have a toll-free number or corporate support, but the support people are knowledgeable and helpful.

Value: Satisfactory. True Basic costs $99.95. Once you start loading it with options — the development tools, the PC Basic conversion program, communications support and advanced string library — total outlay is about $350. This is a lot of money considering the lack of syntax checking in the editor, the lack of a completely integrated programming environment and the confusion of having multiple reference manuals. We also feel that True Basic is implemented better on the Macintosh than on the PC.

Project Calc

less convenient than with stand-alone project management packages, the familiar 1-2-3 environment makes it easy to do analysis, incorporate results directly into budget worksheets and generate reports.

Error handling: Good. Project Calc identifies scheduling logic errors, but it provides only a very general response. It also spots irregularities between time units used in cost assignment and task duration. New data overwrites old data in each cell you edit. Files are saved and protected from being overwritten in the same manner. Error messages are self-explanatory.

Support: Very good. Frontline offers non-toll-free telephone support at no charge for 90 days. A premium phone service for corporate specialists who support end users is available.

Our telephone calls were answered promptly and courteously. When necessary, we received return telephone calls within 15 minutes.

Value: Very good. If you've already invested in 1-2-3 and find your projects too unwieldy to manage manually, Project Calc is a good choice. The $150 investment is a bargain compared with the cost of a dedicated project management package.

NEW PRODUCTS

Systems

A handheld optical character recognition system and scanner has been introduced by **Marq Technologies.**

The menu-driven **Marqsystem** consists of three modular components: The four-button Marqmouse, the Marqscanner and the Marqreader. According to the vendor, the mouse provides a 600 dot/in. resolution, while the scanner offers 16 levels of gray-scale at 300 dot/in.

A transparent window is provided that allows users to view the image as it is scanned, while the actual numeric data can be heard through an audio feedback feature. The Marqsystem works with IBM Personal Computers and compatibles and requires a minimum of 256K bytes of random-access memory.

Marqsystem components range in price from $199 to $1,299.

Marq Technologies, 6285 Nancy Ridge Drive, San Diego, Calif. 92121. 800-336-8366.

Software applications packages

An anti-viral product that was designed to complement existing memory-resident virus-checking programs has been introduced by **Interpath Corp.**

Called **Tracer,** the package executes in two phases: The initial install phase automatically logs the system's hardware and software parameters, and the check phase executes each time the system is booted. All system parameters are then checked for traces of infection, according to the vendor. The software is available for IBM Personal Computers, PC ATs and compatible systems.

Tracer costs $49.95.

Interpath, 4423 Cheeney St., Santa Clara, Calif. 95054. 408-988-3832.

A personal computer product that was designed to provide free 15-min delayed stock market quotes has been announced by **Cablesoft, Inc.**

According to the company, **Livewire** is a small computer board with software that runs on any IBM Personal Computer, PC XT, AT or compatible. The product converts stock quotations that are carried by television's Financial News Network to data that can be read on the PC.

Among Livewire's features are alarms, graphics and the ability to manage multiple portfolios.

Livewire costs $995.

Cablesoft, 307 W. Burlington Ave., Fairfield, Iowa 52556. 515-472-8393.

A software package that enlarges images on Apple Computer, Inc.'s Macintosh systems has been developed by **Berkeley System Design, Inc.**

Designed specifically for partially sighted computer users, **Closeview** is a control panel device that reportedly magnifies anything on the screen from two to 16 times its original size. The program can also invert the screen to white on black.

The package is being shipped as part of Apple's System 6.

Berkeley System Design, 1707 Shattuck Ave., Berkeley, Calif. 94709. 415-540-5536.

Star Software's *entrepreneur's system*

A program designed for emerging businesses and entrepreneurs has been unveiled by **Star Software Systems, Inc.**

Called **Venture — The Entrepreneur's Handbook,** the product runs on IBM Personal Computers and compatible machines and reportedly assists users with business planning and analysis functions. Word processing, spreadsheet, file management and double-entry ledger facilities are included.

Venture costs $349.

Star, 363 Van Ness Way, Torrance, Calif. 90501. 213-533-1190.

Software utilities

Bear Rock Software Co. has enhanced its **Printbar II Bar Code Printing** software package. Printbar II is a memory-resident utility that allows the user to print bar codes and text directly from most applications running on IBM Personal Computers and compatibles.

Version 2.0 offers support of EAN-8 and EAN-13 (European Article Numbering) Code, in addition to Code 39, Interleaved 2 of 5, and UPC-A and UPC-E bar code symbologies. A restrike option allows dot-matrix printers to produce darker bar codes.

Printbar II 2.0 costs $295.

Bear Rock, 6069 Enterprise Drive, Placerville, Calif. 95667. 916-622-4640.

Three software calculators for IBM Personal Computers and compatible systems running under IBM PC-DOS or Microsoft Corp. MS-DOS are now available from **Calctech, Inc.**

The **Xact-11C, Xact-12C** and **Xact-16C** software calculators are said to be functionally equivalent to the handheld HP-11C Scientific, HP-12C Financial and HP-16C Programmer's calculators offered by Hewlett-Packard Co. According to the vendor, each Xact calculator emulates the corresponding HP model and provides additional features, including save-to-disk and on-line Help functions.

The Xact series calculators cost $49.95.

Calctech, Suite 202, 13629 Bellevue-Redmond Road, Bellevue, Wash. 98005. 206-643-1682.

Two products for Lotus Development Corp. spreadsheet users are now available from **Frontline Systems, Inc.**

Project Calc is project management add-in software for users of Lotus' Symphony, and **3-2-1 Blastoff 2.0** is a spreadsheet compiler that reportedly allows Lotus 1-2-3 worksheets to recalculate up to five times faster than previously possible.

According to the company, 3-2-1 Blastoff does not require an Intel Corp. math coprocessor chip and is available in a standard edition for $99.95. Project Calc carries a suggested retail price of $149.95.

Frontline, P.O Box 7408, San Francisco, Calif. 94120. 800-451-0303.

Macintosh products

Absoft Corp. has developed a Fortran compiler that can be ported to A/UX running on an Apple Computer, Inc. Macintosh. Called **Macfortran/AUX,** the product is based on reduced instruction-set computing architecture technology and reportedly meets full ANSI Fortran 77, IEEE P754 and Military

Standard 1753 specifications.

The compiler supports most Digital Equipment Corp. VAX/VMS and several Fortran extensions and provides full access to Unix and the Macintosh Toolbox, the vendor said. A standard Unix-style command line interface and a Macintosh-style interface are also provided.

Macfortran/AUX costs $495.

Absoft, 2781 Bond St., Auburn Hills, Mich. 48057. 313-853-0050.

An enhanced database language for Apple Computer, Inc. Macintosh programmers has been announced by **DBfast, Inc.** The program offers standard Ashton-Tate Corp. Dbase III Plus conventions combined with Macintosh graphical interface functions, the vendor said.

Called **DBmacfast,** the software employs an interactive editor/decompiler for writing, compiling, testing and programming debugging and is scheduled for shipping in this fall.

DBmacfast costs $199.

DBfast, Suite 2857, 1420 N.W. Gilman Blvd., Issaquam, Wash. 98027. 206-392-0368.

A multiuser computer-aided software engineering tool for Apple Computer, Inc. Macintosh computers has been announced by **Iconix Software Engineering, Inc.**

Freeflow V3.0 has been enhanced to include unlimited definition length and can now define data structures for primitive ele-

ments, the vendor said. The product is compatible with Digital Equipment Corp. Tops and VAX-based software capable of emulating Macintosh local-area networks.

Freeflow V3.0 costs $995.

Iconix, Suite 320, 2800 28th St., Santa Monica, Calif. 94045. 213-458-0092.

Software for Recognition Technologies has updated its graphics program designed for Apple Computer, Inc. Macintosh 512E users.

Minidraw 2.0 now includes on-line Help functions and freehand drawing capabilities, the vendor said. The program costs $44.95. plus shipping and handling.

Software for Recognition Technologies, Rochester, N.Y. 716-359-3024.

Innovative Data Design, Inc. is now shipping **Dreams,** computer-aided design software developed for Apple Computer, Inc.'s Macintosh.

The product includes symbol libraries, real-world scaling, geometric tools and enhanced object manipulation and editing functions. The program requires 1M byte of memory and a hard disk, with 2M bytes recommended for the Mac II.

Dreams costs $500.

Innovative Data Design, Suite A, 2280 Bates Ave., Concord, Calif. 94520. 415-680-6818.

Development tools

An object-oriented development environment for Intel Corp. 80386-based Microsoft Corp. MS-DOS machines has been announced by **Parcplace Systems, Inc.**

Designed for mainstream computer programmers, **Smalltalk-80** reportedly features a set of development and information access tools, an object-oriented programming language and code modules. Versions are also available for Unix- and Apple Computer, Inc. Macintosh-based operating systems.

The MS-DOS version of Smalltalk-80 costs $995.

Parcplace, 2400 Geng Road, Palo Alto, Calif. 94303. 415-859-1000.

A neural network simulation system for the IBM Personal Computer and compatibles has been announced by **California Scientific Software**.

Called **Brainmaker**, the product reportedly includes I/O facilities for both visual and symbolic data and allows user networks to manipulate pictures, images, symbols or numbers directly. Support for fuzzy logic is also provided.

Brainmaker requires DOS 3.0 or higher and is priced at $99.95.

California Scientific Software, 160 E. Montecito E, Sierra Madre, Calif. 91024. 818-355-1094.

An application development system that automatically creates its own user's guide has been announced by **International Consulting Enterprises Ltd.**

Called **Applaud**, the program runs on IBM Personal Computers and compatible systems and was designed for use by software developers, auditors and for system prototyping.

The software requires 585K bytes of available random-access memory as well as DOS 3.0 or higher.

Applaud costs $795 per single copy; the networked version is priced at $1,295.

International Consulting, 10 S. Riverside Plaza, Chicago, Ill. 60606. 312-454-3200.

Rational Systems, Inc. has announced **DOS/16M 3.0**, a large memory-development environment for use on Intel Corp. 80286- and 80386-based systems.

The product reportedly allows C, Fortran, Pascal and assembly language programs to break the 640K-byte DOS barrier and enables programmers to directly address up to 16M bytes of code. The program supports several popular compilers, including Microsoft Corp.'s Microsoft C, Microsoft Fortran and Lattice, Inc.'s Lattice C.

An initial development license costs $5,000.

Rational Systems, P.O. Box 280, Natick, Mass. 01760. 617-653-6006.

Training

Learn-PC Video Systems has developed a training program specifically for users of Wordperfect Corp.'s Wordperfect Version 5.0.

The program — **Wordperfect: Beginning Through Advanced Skills** — is available in all video formats. Each training set includes three videotapes, three guidebooks and a practice disk, according to the vendor.

VHS and Beta formats are priced at $895. Three-and-a-quarter-in. U-Matic tapes are available for $1,045. Free trial programs are also available.
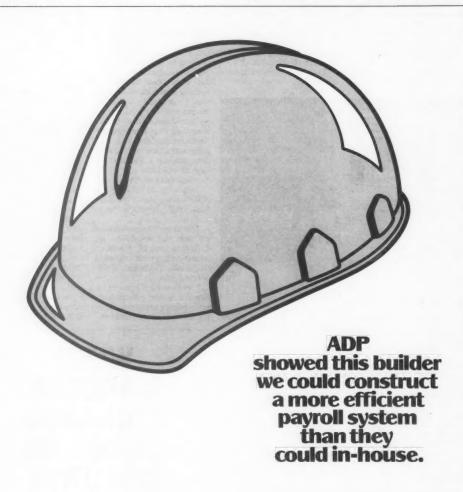
Learn-PC, 5101 Highway 55, Minneapolis, Minn. 55422. 800-532-7672.

Data storage

A stand-alone compact disk/read-only memory reader has been unveiled by **Scenario, Inc.**

Called **Dynabook**, the touch-screen-driven reader reportedly allows the user to retrieve data simply by touching the display in response to on-screen instructions. The product weighs 16 pounds and measures 14 by 14 by 2.9 in., the vendor said, and a personal computer is not required for operation.

Dynabook costs $4,995.

Scenario, 235 Holland St., Somerville, Mass. 02144. 617-625-1818.

Peripherals

A nonelectronic security device that provides storage protection for code names, passwords and keys is available from **Keysure**.

The plastic security box measures approximately 3 by 6 in., and once shut, it can be opened only by breaking the container. The product is targeted at users who want to have complete accountability from anyone accessing keys or password information.

The Keysure device costs $3.60, and quantity discounts are available.

Keysure, P.O. Box 439, Prince Station, New York, N.Y. 10012. 212-219-0015.

Radius, Inc. has added another product to its line of display systems for Apple Computer, Inc. Macintosh computers.

The 19-in. **Two Page Display System** for the Macintosh II displays two 8½- by 11-in. pages or a B-size drawing for graphical design, page layout or engineering in black-and-white. The vendor maintains that the screen resolution of 1,152 by 882 pixels offers users 30% more work space than traditional 19-in. monitors. System software includes menus that can be detached from the menu bar and placed anywhere on the screen.

The Radius Two Page Display System costs $1,695 for the display and $695 for the interface.

Keysure's *security device*

Radius, 404 E. Plumeria Drive, San Jose, Calif. 95134. 408-434-1010.

A device that allows personal computer users to place a parallel printer up to 7,000 ft from the micro system is now available from **Practical Peripherals, Inc.**

Called **Microbuffer P/Link**, the unit reportedly has a 32K-byte buffer, which is expandable to 512K bytes, or 170 pages. Ordinary telephone cable is used for connection and installation, and the product comes with a five-year factory repair and replacement warranty.

Microbuffer P/Link costs $159.

Practical Peripherals, 31245 La Baya Drive, Westlake Village, Calif. 91362. 818-706-0333.

Pencept has introduced a digitizer designed specifically for users of Lotus Development Corp.'s Freelance and Freelance Plus software packages.

The **Pencept Model 320** allows the user to input graphics and character data via a digitizing pad without using the keyboard. The product can reportedly also execute any keyboard command.

The Pencept Model 320 costs $1,095. A **Model 310** option that plugs directly into the computer's serial port is available for $1,195.

Pencept, a division of Numonics, Inc., 39 Green St., Waltham, Mass. 02154. 617-890-8877.

Clary Corp. has announced an option for its Onguard PC-1240 and PC-2400 uninterruptible power supplies (UPS) that will reportedly allow the units to withstand up to 30 and 60 amps of start-up peak current, respectively.

The **start-up surge option** was designed to eliminate the need to oversize the UPS or use a static bypass switch, the vendor said. The product provides six times more current than is required under steady-state conditions. The option is slated to become standard during the fourth quarter.

The start-up surge option costs $75 for the PC-1240 and $95 for the PC-2400.

Clary, 320 W. Clary Ave., San Gabriel, Calif. 91776. 818-287-6111.

Arkwright, Inc. is now offering overhead transparency film for use with dot matrix printers.

The film is optically clear .003-in. polyester and will reportedly accept both a full spectrum of color (from color dot matrix printers) and black ink. It is available in standard 8½- by 11-in. and A4 sheet sizes in boxes of 50 paperbacked sheets. The film is also available in sizes for continuous-feed printers.

The film costs from $31 to $46.25 per box.

Arkwright, Department P, 538 Main St., Fiskville, R.I. 02823. 800-942-5900.

Board-level devices

An IBM Micro Channel add-in board development system that was designed for the IBM Personal System/2 Model 70 is now available from **Capital Equipment Corp.**

According to the vendor, **One Chip Plus** significantly reduces the time and cost of designing and building boards for PS/2 computers. The product is a complete Micro Channel interface on a chip that will aid manufacturers in I/O, memory and multifunction board design. Programmable decoding for extended memory is included.

One Chip Plus system kits are priced from $495 to $995.

Capital Equipment, 99 S. Bedford St., Burlington, Mass. 01803. 617-273-1818.

Boca Research, Inc. has announced an I/O adapter board for the IBM Personal System/2 Micro Channel.

The **Boca.MCA parallel** offers one bidirectional parallel port for attaching additional parallel printers, and up to three boards may be installed in one Micro Channel system, the vendor said. Installation is conducted via the IBM setup program and the .ADF file supplied with the board. The product includes a two-year limited warranty and free technical support.

The product costs $110.

Boca Research, 6401 Congress Ave., Boca Raton, Fla. 33487. 407-997-6227.

Two new IBM Personal System/2, Video Graphics Array (VGA)-compatible graphics adapters are now available from **Genoa Systems Corp.**

SuperVGA Hires has a resolution of 1,024 by 768 pixels in 16 colors and has 512K bytes of video memory. The adapter provides IBM 8514 monitor capability and costs $645.

Genoa is also shipping the **SuperVGA** adapter, which reportedly offers 640- by 480-pixel and 800- by 600-pixel resolution modes in 16 colors, as well as 320- by 200-pixel and 512- by 512-pixel resolution modes in 256 colors. It costs $445.

Both cards feature full VGA and IBM Enhanced Graphics Adapter hardware, BIOS and downward compatibility for the IBM Color Graphics Adapter.

Genoa, 75 E. Trimble Road, San Jose, Calif. 95131. 408-432-9090.

PS/2 hot in West Germany, outsells non-MCA machines

BY DENNIS PHILLIPS
IDG NEWS SERVICE

FRANKFURT — Despite slower than expected growth in its sales in the U.S. personal computer market, IBM has reported booming Personal System/2 sales in West Germany this year.

A price tag of about $10,695 in Germany has not prevented the Micro Channel Architecture (MCA)-based PS/2 Model 50 from becoming IBM's most popular offering there, said Joerg Balser, spokesman at IBM's West Germany subsidiary.

"Last year, one-third of our PCs were Micro Channel machines. This year, two-thirds are Micro Channel PCs," he said.

IBM outsold its next three PC rivals — Commodore Business Machines, Inc., Compaq Computer Corp. and Apple Computer, Inc. — combined, in terms of value. During the first half of the year, IBM delivered 31,000 PS/2s with its MCA, and this should reach 80,000 by year's end, according to a recent study by U.S.-based market research firm International Data Corp. (IDC).

The surge in IBM sales is an ominous sign for rivals still reluctant to offer Micro Channel-compatible systems, analysts said. "It could be a mistake to wait, as IBM is increasing its market share here in West Germany," one observer said. "The competition of IBM is losing a lot of time, saying there is no need now for the Micro Channel. But when you consider these sales statistics, I'd be nervous."

By the end of the year, IBM's share of the professional PC market should triple to 21%, according to a recent IDC survey. It will take a lot of innovation and strong sales to catch up, and by then, West Germany's PC market may be saturated.

Microsoft in fifth leg of Word race

BY DOUGLAS BARNEY
CW STAFF

Microsoft Corp.'s Word recently notched its way to Version 5.0, catching up with archrival Wordperfect Corp., which is also now on Version 5.0. In fact, even Micropro International Corp. has a Version 5.0 of its old standby, Wordstar.

The fifth version of the popular Microsoft personal computer word processor reportedly gains OS/2 compatibility, better integration of graphics, built-in Print Preview, improved data links and net-

> **W**HEN WORD first shipped for the PC, it was awkward and lacked features, company officials admit. But with each release, it has gained functions and received a spiffed-up interface.

work support. The $450 product is scheduled to ship Dec. 31.

When Word first shipped for the PC, it was awkward and lacked features such as integrated graphics, company officials admit. But with each release, the product has gained functions and received a spiffed-up interface. Such improvements led the firm to report over $100 million in word processing revenue for its latest fiscal year, according to Jeff Raikes, manager of Microsoft's Office Business Unit.

As the role of older packages, such as Ashton-Tate Corp.'s Multimate and Wordstar, has declined, Microsoft's main competitor has been Wordperfect, a firm that does little more than produce word processing software. The two firms have battled neck and neck for features, creating products that some have called overkill.

In fact, the features war has led to a whole new class of scaled-down, easy-to-use packages for those with simple word processing needs. In this arena, Software Publishing Corp., with Professional Write, and Symantec Corp., with Q&A Write, have done battle.

User's tool
Word 5.0, clearly a power-user's tool, supports expanded memory and has built-in network support. For work groups and group editing, the system maintains the automatic red-lining found in Version 4.0. Similar to For Comment from Broderbund Software, Inc., Word 5.0 keeps track of each reviewer's comments and shows when the comment was made.

Microsoft also borrowed, at least in part, a concept from Borland International, which pioneered the so-called soft-user interface. Where some Borland products allow users to pick an interface that is familiar, Word 5.0 allows a user to find the Word command that corresponds to the similar IBM Displaywrite command.

Users praise multiuser product for DOS PCs

BY WILLIAM BRANDEL
CW STAFF

Early users of a product that brings multiuser features to a PC without requiring an IBM Token-Ring network recently praised its speed and multitasking capabilities.

The product is called 386/Multiware and is being offered by Alloy Computer Products, Inc., based in Framingham, Mass. As the product's name implies, 386/Multiware brings several capabilities to DOS users operating a personal computer based on the Intel Corp. 80386 processor.

The product is packaged in various configurations. For example, when using Alloy's 386/Multiware operating system, the NX386 processor, two intelligent IMP2 cards (which each support two users) and two IMP8 cards attached to a terminal array panel, the system supports up to 21 users. This configuration costs $5,775.

Good news
The product is a boon to PC shops for two reasons. First, it allows several users to share the same application, creating a 386 PC network without investing in an IBM Token-Ring or Novell, Inc. Netware network. Second, the user can perform multitasking without buying a PC windows product. In short, it gives the user today what an IBM Personal System/2 Model 70 or 80 running OS/2 might give the user

tomorrow.

"The fact that it offloads RAM access to the IMP cards instead of loading up the 386 processor [makes] this product lightning-fast," said Nick Johnson, president of Compusystems, Inc., a medical computer system vendor based in Columbia, S.C.

Johnson said the product is fast enough even with eight users to support his graphics-intensive scheduling system, which has crippled other multiuser systems. But, he added, the product is ideal for three to four users, which is the mean number of users in the company's product sites. Johnson has ordered 20 packages of the software to incorporate into Compusystems' medical systems.

Comparison shopping
Johnson said he compared the Alloy product with comparable offerings such as PC-MOS/386 from The Software Link, Inc. in Atlanta. But, he said, because the PC-MOS product addresses random-access memory completely from the processor, it could hardly be called a rival to 386/Multiware, which addresses RAM through IMP cards.

Alloy is currently working on a 386IS product, Johnson said, that will host its own 386 processor and 4M bytes of RAM on each of the IMP cards. The strategy, Johnson said, is to boost the power for every group of eight users, ensuring maximum speed.

Agency Management Ser-

vices, Inc., located in College Station, Texas, intends to use Multiware/386 on both Micro Channel- and Personal Computer AT-style machines, according to Ted Johnson, vice-president of technical services. He has installed and is beta-testing the NX386E software package, which includes an IMP2 intelligent multiport card that provides ports for two additional users and two IBM 3151 ASCII terminals.

In all, this arrangement supports three users and costs $2,480.

Encouraging news
Johnson said his test results are encouraging him to implement 386/Multiware as the foundation for his company's PC network.

"The significant factor about this product is that it allows us to put more than one user on the PS/2," Johnson said. "I believe that IBM designed the Micro Channel to support multitasking, but as it stands alone, there is nothing magic about it." However, he added, "the multitasking is a secondary requirement."

Johnson said he will complete testing the product's performance this week and is so far pleased with how it has fared. But performance aside, he said, when roughly compared with a Token-Ring network, the 386/Multiware product costs less than half to support the same number of users.

The product comes in various configurations. Prices range from $395 to $5,775. The IMP multiport cards and IBM 3151 terminals are included in their allocated multiuser product's packaging. The IMP cards each contain their own processor and 640K bytes of RAM.

End-user
FROM PAGE 45

will be among several technological developments that will drive end-user computing into corporations, Tapscott said.

"The computing influence of MIS will disperse. The changing information economics, which will put mainframes on desk tops in the 1990s, will mean that there will be no need for a centralized computing facility," he said.

But a strong central computing group will still be needed to design corporatewide applications, to develop a coherent data architecture management capability and to introduce new strategic applications, Tapscott added.

William Jarvis, president of The Transition Group, Inc. in Toronto, echoed the view that the role of corporate information services will change as a result of the increase in the influence of end-user computing.

"By the mid-1990s, every white-collar worker will have a personal computer on his or her desk," Jarvis said. "That is why end-user computing will become a dominant force."

Taking on traditional roles
End users will take on some of the traditional roles of information systems, Jarvis noted. Rather than using resources to control PC purchasing levels and developing small applications,

the IS will devote more effort to developing a technology strategy and architecture and coordinating overall system planning, Jarvis said.

End-user computing has reached a critical mass, said Jan Duffy, a partner in the information technology practice at Peat, Marwick, Main & Co. in Toronto. The penetration of computers is nearing parity with the number of office workers. End users are knowledgeable about the benefits of computing and are eager to take on the end-user computing challenge, she said.

End-user computing is expected to grow much faster than the rest of IS as a result of organizational decentralization, increased user sophistication and anticipated innovations in hardware and software, Duffy said.

"End-user computing costs may account for 41% of the corporate IS budget by 1990, up from 30% in 1986," Duffy said.

George Sekely, vice-president of computers and communications at Canadian Pacific in Toronto, urged members of the audience to strengthen their commitment to automation.

He suggested that MIS managers allow their end users to communicate directly with the corporation's information. MIS must avoid becoming only an intermediary, as a travel agent is today on an airline reservation system, Sekely said.

"Tomorrow, the end user will be the person who wants to fly," he said.

Private Eye
FROM PAGE 45

front of one eye and tricks the brain into thinking that the display's images are floating about two feet in front of the viewer.

The company said the image is equal in size and resolution to a 12-in. CRT. In the current model, the display coloring is red on black.

Reflection Technology declined to reveal how the display operates, for fear that competitors would rob the company of its technology before it could be patented.

Can wear many hats
Steve Lipsey, vice-president of marketing at Reflection Technology, envisions that the device will be used in a variety of products, in which portability and full-size displays are needed.

The Private Eye could be used to replace the single-line display of a pocket calculator or pager, for example, with a full-size screen, Lipsey said.

"We think that they could be used in what we're calling personal information devices, perhaps with a [compact disk/read-only memory] player worn on a belt and a telephone handset on the headset for voice/data applications," he said.
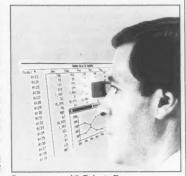
Lipsey said that a variety of companies have expressed interest in designing products using the innovative new display.

"We think that the first products could be introduced as early as Comdex/Spring '89," Lipsey said.

Asteroids?
Video-game companies are especially interested in the tiny device, to be used in a new generation of games with three dimensions or other special ef-

Eye-to-eye with Private Eye

fects, he added.

The company plans to market the display "to any company we think can build a product," Lipsey said.

The cost of the display will vary between $100 and $500, depending on the quantity, he said.

Some large manufacturers of consumer products may be able to acquire the display for less than $100, he added.

Barney

multitasking is just not worth the bucks. One user suggested an alternative. Have the employee keep the low-end system and give out bonuses for extra work. That's how you boost productivity.

PC heresy. An MIS coordinator recently complained about the sorry state of local-area networking. These LANs are fine for stringing together large numbers of personal computers. But for groups of four or five PCs, it just isn't worth the trouble. This person was looking for a cheap, easy way to let small groups of users share information.

That's when it hit home. Maybe PCs aren't so great after all, and maybe sharing processors isn't so bad after all. At *Computerworld*, we have a shared-processor system. Need to send a file to your boss? No problem. Want to read it at the same time? If MIS lets you, you can. Want to send a message? Piece of cake. And our technology is considered by some to be hopelessly out of date. It won't run Lotus' 1-2-3 and it isn't 32 bits, but it does the job it is supposed to do rather well. Try that with PCs, and you might just enter the network nightmare. Some of these systems are too new to be as reliable or effective as shared processors.

So let's keep charging after better micros and better networking. But let's keep the large-systems vendors working

on more cost-effective shared-processor alternatives, particularly for small work groups. They may find a willing and relieved market.

Keep it complicated, stupid! There has been a lot of yakking about making software easier to use and applications easier to develop. That scares a lot of people. It is particularly frightening to the large group of computer consultants who make money figuring out things that boggle the minds of the average Joe.

These folks are a lot like lawyers. As long as laypeople don't understand their special syntax, they are free to charge big bucks to figure things out.

As easy software and easy applications development tools keep coming,

these folks will shout louder and louder about the lack of technical depth. If it isn't complicated, it won't do the job, they'll say.

Don't believe it. A lot of sharp vendors will figure out simple ways to do complex things, and computer managers should welcome this influx. With users more self-sufficient, MIS can concentrate on the true leading edge and the true strategic use of information systems.

So that's why people use PCs. Ever wonder why people use PCs? Ken Olsen, who espoused his quirky, iconoclastic and insightful views at a recent press conference, obviously has.

According to Ken, there are three types of desktop-device users. Terminals, the most reliable device, are for people who "never want to look at a floppy disk." They are also for "secretaries who never want to take their fingers off the keyboard and never want to look at more than 20 lines or so."

And last but not least are the computer scientists, who "have access to everything and want to use a computer just for its own sake." Workstation users weren't really defined, but Olsen admits his company "loves to sell them."

PC users are the most interesting group. PCs are great for people who need software that only PCs can provide. But they are also for those who, when at a party, want to tell others about their PC, Olsen said. Ken doesn't fall for this, though. "I am probably the only manager who gets his picture taken in his office without one in the background," he explained.

Olsen also spoke out against over-engineering of PC devices. "We sometimes make a mistake and our customers sometimes make a mistake by having technology bugs lay the specifications, ask for everything and [then] the customer can only afford a few desks."

It is about time a computer vendor stood up and spoke those words.

Decmart. Digital Equipment Corp. used to only sell stuff it made. That was one of the problems with the Rainbow. DEC made its own RX-50 floppy drives that didn't work with anything else, plugged in its own VT keyboard and used its incompatible serial port for printing when everyone else was going parallel.

DEC is starting to learn that some companies can do a better job building disk drives, chips, software and PCs themselves. That is why DEC has announced a stream of agreements to resell other people's machines or use other folk's processors.

So then, next time you go to a big DEC trade show, don't be surprised if the loudspeaker blares, "Attention Decmart shoppers. In aisle one, we have a special on database software. Two for just $10,000."

Nerd Perfect. At long last comes a software company with an honest name. Called Vaporsoft, Inc., the firm markets Nerd Perfect. For close to $10, users get a blank floppy disk and documentation on how to use it. The firm calls this new approach WYGIWYG, for what-you-get-is-what-you-got. The company has even signed software distributor Kenfil to carry the product. At least there are no bugs!

Barney is a Computerworld *senior editor, microcomputing.*

PCs replace

Gantt said he also likes to drop by the learning center to "fool around" on the Mac II, although he doubts he can justify buying one for work. "The more I become involved with the learning center, the more I want to do," he said. "I have to stop myself. There are other things that have to get done." The computer learning center is operated by the MIS department within the Ground Systems Group.

Mary Howlett, manager of information technology, is the lead administrator for the learning center. The center consists of the training center, which holds classes and special events, and the advanced office products center, which is better known as the demo room.

The learning center was consolidated at its location earlier this year. Since the summer, the training-center side is busy with classes and other special events eight hours each day. Use of the demo room is still sporadic, but Howlett said she expects the volume of visitors to increase as more equipment is brought in. The demo room is always staffed to ensure that it is used appropriately.

Fully equipped

Currently, the room is equipped with IBM Personal Computer ATs, Personal System/2 Model 50s and Macintosh SE PCs. Also, it houses an IBM Proprinter XL, a Hewlett-Packard Co. Laserjet and an Apple Laserwriter printer. Howlett is looking into acquiring a Compaq Computer Corp. Deskpro 386.

Each quarter, the training center offers more than 12 classes, most of them taught by Howlett's staff. Among the subjects offered are "Introduction to the IBM PC" and "MS-DOS: The Essentials" for the first-time user. Advanced classes include database and graphics classes for both the IBM PC and the Macintosh.

IBM offers aid to hearing-impaired

Speech- and hearing-impaired computer users can communicate more effectively with the aid of a new product from IBM called the IBM Personal System/2 Speechviewer.

The product is designed to boost the effectiveness of speech therapy provided by speech pathologists, special education teachers and other professionals.

Speech sounds are entered into a personal computer by means of a microphone and are then digitized and stored for analysis. A loudspeaker and animated displays provide aural and visual feedback of specific attributes of speech such as pitch, loudness and timing.

End users with speech disorders can use the product to practice and master concepts for building awareness, speech skills and patterning, IBM said.

Speechviewer, the second product in IBM's Independence series of tools for users with special needs, is designed for use with IBM PC-DOS Version 4.0 on a PS/2 Model 25 or 30.

A complete package, available as the Speechviewer Convenience Kit, is scheduled to be available next month for $1,200.

Also during each quarter, MIS issues a catalog of courses to users within the Ground Systems Group. At the start of each quarter, there is a waiting list of between 400 and 500 users, which results in a four-week wait for most classes. The center is able to accommodate most users by the end of each quarter.

Most of the classes are completed in one day and must be approved by the student's supervisor. Classes are deliberately small so that only one or two students share a computer.

"Everyone in the classes is on a similar learning plane so that I've always felt comfortable in them," said Patty Ward, an executive secretary. "Afterward, you can run down to the center and pester the teachers if you have a question." Ward's

supervisor has encouraged her to spend time at the center. The center sponsors other activities including users groups and offers them space and equipment for lunchtime and after-work meetings.

Speakers from vendors like Apple and Microsoft Corp. have also conducted demonstrations of new products. An Apple representative conducted a session on

Hypercard, a program that enables users to write their own applications for the Mac, shortly after its introduction.

Howlett and her staff developed the curriculum from close contact with "technical representatives," who are key users within each of the group's divisions. "They are the people in the divisions who support the users," Howlett said.

> "THE MORE I become involved with the learning center, the more I want to do. I have to stop myself. There are other things that have to get done."
>
> TIM GANTT
> HUGHES LEARNING CENTER USER

NETWORKING

Patricia Keefe

Playing cloak and dagger

Enough already with the hints. It's about time IBM picked up its wishy-washy self and just spit out its support plans, if any, for Microsoft's OS/2 LAN Manager. Little dribs and drabs of hints and obfuscation have trickled out over the last year via this user or that publication, usually followed by denials. It's a very irresponsible way to deal with one's customer base, particularly those trying to develop some long-term plans.

According to IBM Austin's Mike O'Dell, Microsoft's Named Pipes applications programming interface "gets a heck of a lot more attention than it deserves; there is nothing exceedingly wonderful about it." The real issue, he said, is interoperability between IBM's OS/2 LAN Server and LAN Manager-based servers. Moreover, O'Dell said he would "love to clarify the confusion." So why the cloak-and-dagger routine?

After confirming that Named Pipes is in IBM's OS/2 Standard Edition 1.1, O'Dell noted that it is not documented (why?) and then stressed he's not announcing anything. He also declined to say whether Named Pipes would be supported in OS/2 Extended Edition. Continuing this dance further, he said, "It's not whether we'll announce it [Named Pipes], we've got to make sure that we've got

E-mail weaknesses irk users

EMA panel details pressing need for generic mail gateways

BY PATRICIA KEEFE
CW STAFF

BOSTON — Already entrenched in much of corporate America as a desktop productivity tool, users today are demanding help from vendors in their efforts to turn electronic mail into a competitive tool.

While speaking here at the recent Electronic Mail Association's (EMA) conference, representatives from a number of Fortune 500 firms bemoaned a pressing need to be able to message business partners using CCITT's X.400 gateways between in-house E-mail systems.

Currently, these users either build customized gateways or opt for mailboxes on public networks. Some resort to daily overnight mail exchanges.

The X.400 gateways promise to resolve multivendor E-mail messaging and integration headaches. But while early offerings conform to the X.400 standard, they are not compatible with each other, said Gerald Brown, a senior systems analyst for corporate information systems at

Eastman Kodak Co. in Rochester, N.Y., and James Burridge, a senior systems analyst at the Management Systems Division of The Procter & Gambel Co. Brown and Burridge are responsible for massive E-mail systems, consisting of third-party and internally developed packages.

Vendors are listening

"The theme I'm hearing from users is that vendors really need to work together to make sure that their X.400 gateways interoperate," said Brown, who added that there is evidence that vendors are listening.

That they do listen is critical for installations such as Du Pont Co., where 5 million out of the 50 million messages sent per year cross vendor networks.

Another approach calls for "genuine" interconnection between public service vendors, such as Telenet Communications Corp. and Tymnet/McDonnell Douglas Network Systems Co. or MCI Communications Corp. and Dialcom, Inc., said Walter Ulrich, a partner at Coopers & Lybrand.

In the meantime, Brown observed that it is "self-defeating and tedious" for users to have to painstakingly build one bridge at a time between their individual mail systems. This is exactly what Kodak has had to resort to.

Hughes Aircraft Co. made a conscious decision to avoid having one-to-one gateway answers, opting to go with products from Softswitch, Inc., a maker of gateways. While Hughes still has a series of gateways to contend with, the difference, according to Manager Peter W. Donaghy, is that they are all part of the same system.

Heavily decentralized, Hughes, too, boasts a menagerie of E-mail systems — some homegrown, some purchased from outside suppliers. Along with Mitel Corp., Hughes plans to add electronic data interchange (EDI) to its mail com-

UCLA, IBM to link SNA, TCP/IP

BY PATRICIA KEEFE
CW STAFF

LOS ANGELES — IBM and the University of California at Los Angeles recently kicked off a joint two-year project that reportedly will result in an integration of IBM's SNA with TCP/IP on one giant network.

The $5 million effort calls for parts of the UCLA campus to serve as a laboratory for future academic and business communications links.

UCLA said it is installing high-speed fiber-optic links on campus that when combined with IBM's Token-Ring technology, will form the building blocks of the campuswide network.

First telco LAN offering bows

Bell Atlantic's file server set to ship early 1989

BY MITCH BETTS
and ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — Bell Atlantic Corp. last week became the first regional Bell holding company to roll out plans for a customer-premise-based local-area network product. When it ships in early 1989, Lanserver Plus reportedly will link a wide variety of user workstations to either an Ethernet or IBM Token-Ring LAN.

The regional holding company also changed the name of its central office LAN from C.O. LAN to Langate. Lanserver,

which is located at the customer's site, communicates with Langate via an interface with the AT&T Datakit switch located at Bell Atlantic's central office. A gateway enables Langate users to connect to Ethernet LANs at 19.2K bit/sec., the vendor said.

Inside

- Ready, set, go OSI. Page 68.
- Gore calls for supercomputer hookup. Page 66.
- Alloy devises PC share system. Page 73.

Data View

Twisted-pair use climbing

As LANs grow in popularity, more users choose twisted-pair wiring over more expensive and less flexible coaxial cable

PERCENT OF SITES

	Twisted-pair	Fiber-optic	Coaxial
April 1986 Base: 10,000 sites			
April '87 15,000			
April '88 18,000			

SOURCE: COMPUTER INTELLIGENCE
CW CHART

First telco

Lanserver Plus uses a Digital Equipment Corp. VAX to provide file and printer sharing, along with electronic mail services to users on one or more LANs, the vendor said.

Communications takes place via DEC's Digital Networking Architecture, and applications software is provided by Bell Atlantic subsidiary Technology Concepts, Inc.

Lanserver is the first product to result from the government's decision to allow the Bell operating companies to integrate the resources of regulated and unregulated subsidiaries, according to Bruce Gordon, Bell Atlantic's vice-president of marketing.

It has also left at least one network analyst somewhat puzzled. The announcement "really doesn't make them a general-purpose network supplier," said David Terrie, a consultant and president of Newport Consulting in Salem, Mass. "It's not obvious to me why you would use them instead of DEC, except perhaps for service and maintenance agreements."

Moreover, Terrie suggested that personal computer-oriented users should opt for a PC server.

"On the higher end, I'd find myself a hotter box with better price/performance than a VAX," he said.

Support and service, which is provided through Bell Atlantic's subsidiary Sorbus, Inc., could be another point, Terrie said.

Bell Atlantic "may make up for that with software, but it can't compete with 3Com or even Netware with bundled-in software," he said.

Lanserver Plus Release 1 will provide server applications to both asynchronous terminals and microcomputers using Microsoft Corp.'s MS-DOS 3.1, the vendors said, while also acting as a gateway for Ethernet LANs.

All workstations must be outfitted with voice/data multiplexers. The asynchronous serial communications port reportedly transmits data at speeds ranging from 300 bit/sec. to 19.2K bit/sec.

Scheduled for availability in early 1989, pricing for this initial server release varies greatly. A spokesman outlined one scenario featuring 100 workstations at four different locations and said that configuration could cost $1,300 per user or could be leased at $34 per month per user.

Release II, slated for late 1989 availability, reportedly will provide a gateway to IBM's Token-Ring network, will support Apple Computer, Inc.'s Macintosh and will integrate the Lanserver and Langate network control systems. Network management features will also be part of the second release.

Future enhancement plans call for a gateway to IBM's Systems Network Architecture and Personal System/2s, proprietary E-mail systems and Integrated Services Digital Networks, Bell Atlantic said.

BIT BLAST

HP licenses Apollo's NCP

Hewlett-Packard Co. has become the latest major computer vendor to license **Apollo Computer, Inc.**'s Network Computing System. HP said it is evaluating how to implement the distributed application platform on its Unix-based computers.
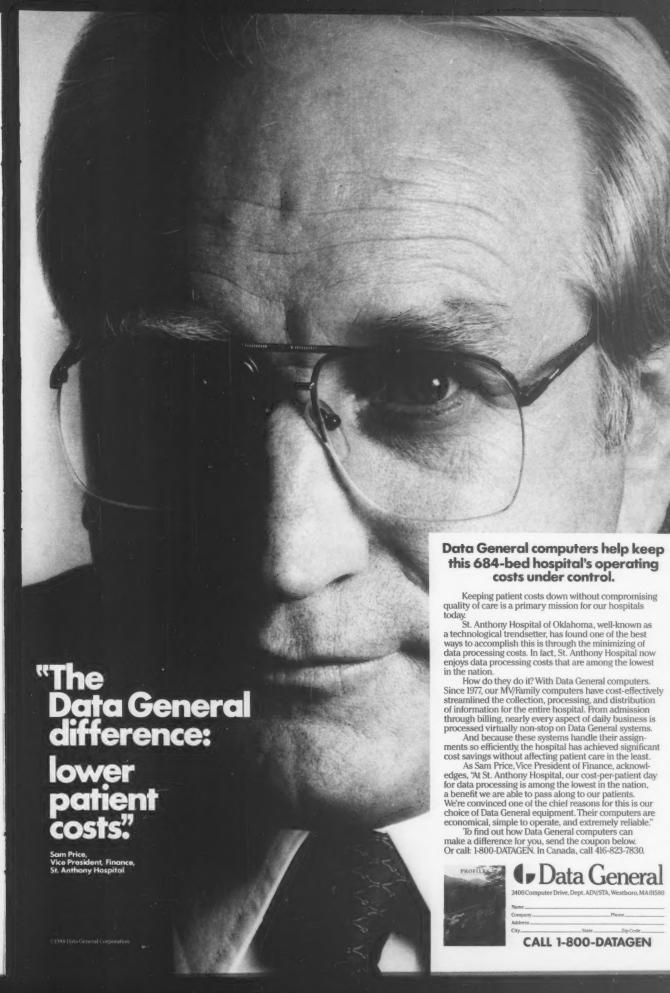
While speaking at the recent National Research Council symposium, **Sen. Albert Gore** (D-Tenn.) called for the construction of a federally funded high-speed fiber-optic network to connect U.S. supercomputers. Gore described the nation's bank of supercomputers as an untapped resource and compared his planned network to an interstate highway system whereby state governments could build interchanges to connect to a national network.

Motorola, Inc. announced that it would participate in an Integrated Services Digital Network (ISDN) trial with **Northern Telecom, Inc.** and regional Bell holding company **Ameritech** starting in early 1989. Both Ameritech and Motorola hope to come out with ISDN equipment and services within a year. According to Ameritech, the trial will explore using ISDN to connect different areas within a business enterprise.

Timeplex, Inc. has provided a new user interface said to make it easier to operate its Time/View network-management workstation family. The interface features mouse-driven color graphics and pull-down menus. Different aspects of the network can be brought up in multiple windows, the vendor said.

10Net Communications, Inc. will demonstrate **Digital Communications Associates, Inc.'s** Select LAN Manager OS/2 software at Comdex/Fall '88 next month. 10Net users will be able to attach DOS workstations to DCA's Select server by the second quarter.

Hayes Microcomputer Products, Inc. said it has developed a Multi-Copy Software Licensing Program for its Smartcom products. The program enables users to make 10, 100, 500 or 1,000 authorized copies of the Hayes software for use at any user location, not just at one site.

Firms forecast OSI migration plans

BY ELISABETH HORWITT
and PATRICIA KEEFE
CW STAFF

Following nearly a decade of preparation, a number of firms are gearing up to migrate to the Open Systems Interconnect (OSI) networking standard by 1991, according to Coopers & Lybrand.

The New York-based accounting and consulting company recently released the results of a survey of 122 attendees at the June Enterprise Networking Event (ENE). More than 65% of the respondents said they plan to start implementing OSI within two years (see chart).

Among the business sectors anticipating the most OSI activity within this period are the automotive manufacturers and insurance companies. Among the former, 57% said they would have OSI systems installed by 1991, while 43% said they would be in the process of implementing systems.

Among insurance companies, 50% of the respondents said they planned to have OSI systems up and running by 1991, and another 33% said they would be implementing such systems.

The rest of the respondents break down as follows: 72% of aerospace manufacturers said they would be in the process of implementing OSI by 1991; general manufacturing brought up the rear, with only 6% of respondents planning to have OSI installed by 1991 and only 14% expecting to have implementation plans by that time.

It should be noted that the above numbers do not necessarily reflect OSI plans for the industries in general, since ENE dealt primarily with OSI products and vendor strategies and naturally drew users already interested in the standard.

OSI implementers are leaning heavily — 64% — toward executing the standard on both local- and wide-area networks, although 33% said they would implement OSI solely on LANs.

Despite fermenting OSI installation activity, some user needs have yet to be addressed by the standard, Coopers & Lybrand said.

For example, 70% of respondents said they would like an interface between OSI and IBM's Systems Network Architecture (SNA). IBM has announced, but not yet delivered in the U.S., OSI-to-SNA gateways.

> ## "OVER THE next few years, OSI will emerge as the only serious alternative to [IBM's SNA]."
>
> PAUL NELSON
> VENTURE DEVELOPMENT

Finally, the lack of interoperability between OSI and other networking environments, such as Transmission Control Protocol/Internet Protocol, was of concern to 37% of the users.

Other users were bothered by the lack of a well-defined migration path from other environments to OSI (23%) and a lack of OSI-based network management protocols (17%).

"Over the next few years, OSI will emerge as the only serious alternative to [IBM's SNA]," said Paul Nelson, a networking consultant with Venture Development Corp. in Natick, Mass., which is also tracking OSI demand.
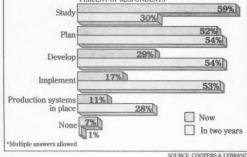
However, he cautioned users seeking to migrate their systems to OSI that OSI is only as valuable as the business solutions wrapped around it. "It's what you do once you have an OSI-based platform implemented that determines how well or to what degree different vendors' computers can be integrated."

Another issue, according to Nelson, is the OSI software that resides in host computers. "This is the custom, intensive and very complex side of the total OSI equation," he explained.

Conversely, Nelson noted that the relatively cheap part of an OSI implementation lies in the board- and box-level turnkey products that exist for at least the bottom four layers, and in some cases, all seven layers.

These products, coupled with advancement in silicon technology and competition, will result in OSI becoming a relatively inexpensive commodity over the next few years, he claimed. The dropping prices, in turn, should encourage the respondents to move toward implementation.

On the drawing board

Of the 122 Enterprise Networking Event attendees polled, most project that in two years, they will be in the throes of development and implementation

PERCENT OF RESPONDENTS*

Category	Now	In two years
Study	30%	59%
Plan	52%	54%
Develop	29%	54%
Implement	17%	53%
Production systems in place	11%	28%
None	7%	1%

*Multiple answers allowed

SOURCE: COOPERS & LYBRAND
CW CHART

Wollongong unveils first members of OSI family

BY MITCH BETTS
CW STAFF

PALO ALTO, Calif. — The Wollongong Group, Inc. recently unveiled the first two products in a family of Open Systems Interconnect (OSI)-based networking software for Unix-based systems.

Wollongong's OSI line — WIN/OSI for Streams — is primarily aimed at government and commercial users who are starting OSI pilot programs, as well as OEMs that are building OSI-compatible products, according to Dan E. Ladermann, Wollongong's vice-president of advanced programs.

The first two products are WIN/ULS, which provides protocols for the upper-level services of the OSI Reference Model, and WIN/FTAM, an implementation of the FTAM protocol.

The WIN/OSI family is modular, so users can choose only the pieces they need or can afford.

Ladermann added that the technology, which is intended to provide a smooth transition from Transmission Control Protocol/Internet Protocol (TCP/IP) to OSI, allows WIN/OSI modules to run on top of a TCP/IP foundation.

Pilot projects

Although the TCP/IP market will continue to grow for the next three to five years, some users are starting to develop OSI pilot networks now, Ladermann said.

WIN/ULS implements Levels 5, 6 and 7 of the OSI model and reportedly can run existing TCP/IP or OSI transport protocols. WIN/FTAM allows users to modify and manage — not just transfer — files on remote, dissimilar computers, the vendor claimed.

WIN/ULS and WIN/FTAM each carry a price tag of $615 and will reportedly be available in January.

The WIN/OSI for Streams family is said to work with any AT&T Unix System V Release 3 Streams environment, according to Wollongong.

Keefe

the appropriate level of work done around it." Huh?

If you're still with me, relief is on the way. LAN Server is expected to emerge from its vapor shroud within the next two weeks, along with IBM's 16M-bit Token-Ring and some micro-to-mainframe software. At this point, IBM will have to officially announce something documented that has received the right amount of work.

Fruit salad anyone? You knew Novell was going to protest the Microsoft-sponsored benchmark of its LAN Manager vs. Netware running over DOS. But those Red-heads from Utah do have some good points. It's a bit strange to benchmark an OEM product against an end-user product. Couldn't Microsoft have tested 3Com's 3+Open OS/2 client software against Novell's Netware OS/2 client software?

On the other hand, most benchmarks are essentially rigged. The point is to play up the best feature of your product. And there are those who think Novell doth protest too much. After all, 3Com has found more than a little fault with some previous Novell benchmarks.

This brouhaha is just one more reason why users should turn their backs on vendor-funded benchmarks. The best benchmark for any user is a test-run on the targeted in-house system. Test the product under your normal conditions and then do your darnedest to crash it.

> **T**HE BEST benchmark for any user is a test-run on the targeted in-house system.

Waving the Proteon flag. The Proteon Users Group (PUG) held its inaugural meeting two weeks ago in Boston. A gathering of approximately 65 users elected Bob Rodgers as president. Rodgers is a technology planner specializing in telecommunications and networking at Chrysler's engineering group. Also elected as treasurer was Kent England from Boston University. Three special interest groups were formed: PC LAN Technology, Routers and Network Management. Users interested in PUG can contact either Rodgers — who warns he's hard to reach — at 313-956-3525 or Suzanne Barclay at Proteon.

Top-down development. This past year has seen a host of companies come out with low-end versions of their more sophisticated offerings. Even as the industry leaders in networking race toward ever more complex and far-reaching communications, it seems many more are heeding the siren call of market opportunities. Pundits have estimated that less than 5% of the LAN market has been tapped.

Expect this second wave of LAN users to focus on highly user-friendly products that are easy to install and manage.

Covering the bases. Look for Netware on the shelf next to 3+Open in Radio Shack stores shortly. It seems Tandy has encountered a demand that it feels it can't refuse, sources say. Unwilling to lose hardware sales tied to Netware, Tandy reportedly already has some field reps installing and supporting Netware. The company declined to comment.

Keefe is a Computerworld *senior editor, networking.*

E-mail
FROM PAGE 65

plex. As EDI provides a means for business partners to communicate, mail vendors may soon find themselves under pressure to also provide support for ANSI's X.12 standard for EDI.

Directory services is another area crying out for integration. "Users want to know how to merge three different mail products into one directory," Brown said. Kodak has pulled off a similar feature, prompting much attention from audience members after the panel session. X.500 is expected to address this issue.

In the meantime, Donaghy cites two key contributors to maintaining the growth of E-mail within large corporations: ease of use and reliability. "We need to work on stable, reliable, consistent and cost-effective systems," he said.

He cited a change made in Hughes' internally developed mail system, PC Office, which allows users to automatically upload, distribute and translate documents between mail systems at the touch of a single function key.

"When we put that in, we saw a huge jump in the use of electronic mail and document exchange. Before, it wasn't used much because it was too cumbersome," Donaghy explained.

Many firms have already successfully sold the benefits of E-mail internally. "So now you have lots of people depending upon it, and you'd better make sure you have a reliable and stable service or you're going to have some very upset users," Donaghy said.

It will take time and effort, but one way to do this is to set up an expert system to assist in automating processing and monitoring of all the mail that is generated. Another avenue is to encourage vendors to build that type of monitoring into their mail systems.

UCLA, IBM
FROM PAGE 65

A major focus of this study will involve connectivity between IBM's Systems Network Architecture (SNA) and Transmission Control Protocol/Internet Protocol (TCP/IP)-based networks. In what might be seen as an effort to find a home for the IBM mid-range processor, the 9370 is the targeted gateway.

Currently, the extended UCLA campus features a mixture of three major IBM networks, along with a variety of other third-party networks. The use of different protocols on these networks has made communications among some of these networks cumbersome or impossible.

One of UCLA's goals is to develop methods and procedures for managing and maintaining a network with multiple protocols.

There is a possibility that IBM's custom work with UCLA could yield commercial products. For example, integrating SNA and TCP/IP networks into one campuswide network is expected to produce in-depth knowledge on network management and requirements.

Also, IBM's network management products, including Netview, will be used to facilitate the school's current efforts to fold its telecommunication and computing organizations under one umbrella.

Ultimately, the network will extend to 10,000 workstations, link buildings located on 411 acres, serve numerous off-campus networks and provide several options for accessing supercomputers.

ABCs of E-mail

The following are the dos and don'ts of selecting personal computer-based E-mail packages. Originated by Baxter Healthcare, Inc., these guidelines were adopted by CC:Mail, Inc., a developer of mail software, and presented at a recent EMA panel.

● Do check references carefully. Ask to speak to other users.
● Do understand your requirements and plan for future connectivity.
● Do look for a package that is easy to learn and use and that features pointers to a central database, encryption and clean-up and disaster utilities.

● Don't use network-specific mail packages. Users move around to different departments, and different departments use different local-area networks. A generic package that runs over a number of LANs affords the most flexibility and protects users from having to learn a number of mail command sets.
● Don't believe the salesman. Baxter recommends the credit-card test. If the salesman tells you his product can meet your requirements, whip out a credit card and offer to deal on the spot. Don't be surprised if the saleman backs down.
● Don't underestimate your success. Many EMA speakers said the number of users taking advantage of their company's mail systems was well beyond original projections.
● Don't buy whistles and bells. Most users don't use them, according to CC:Mail.
● Don't change your lifestyle. A mail package should fit your environment and corporate culture, not the other way around.
● Don't judge all PC packages by one. Different packages have different capabilities — examine several.

PATRICIA KEEFE

NEW PRODUCTS

Local-area networking hardware

A product designed to allow two or three microcomputer users to share files and databases is now available from **Alloy Computer Products, Inc.**

Called **PC-Twin**, the product consists of an Alloy processor board and an IBM 3151 terminal with a connectivity cartridge. The package also includes a two- or three-user version of the vendor's Babynet software and is said to run on any IBM Personal Computer, PC XT, AT or Intel Corp. 80386-based class machine using IBM's Enhanced Graphics Adapter, Video Graphics Array or other host video equipment.

PC-Twin costs $1,695.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701. 800-432-4356.

A local-area network card that is compatible with Arcnet specifications as well as both bus and tree topologies is being offered by **DTK Computer, Inc.**

Dubbed the **PCI-001 Da**-tanet LAN Card, the product reportedly provides data transfer at rates up to 2.5M bit/sec. and supports up to 255 nodes per network segment.

According to the vendor, a modified token-passing protocol prevents collision and loss of data. Maximum cable length between two cards is 1,000 ft for bus topology and 22,000 ft for tree topology. The card was designed primarily for Novell, Inc. networks but will also work with other baseband systems.

The PCI-001 Datanet LAN Card costs $195 for a bus-topology configuration and $145 for a tree-topology version.

DTK Computer, a division of Datatech Enterprises Co., 15711 E. Valley Blvd., City of Industry, Calif. 91744. 818-333-7533.

Compex, Inc. has announced a four-port Arcnet local area-network controller for the IBM Personal Computer XT, PC AT and compatible machines.

The controller card, dubbed **A-Net**, allows users to build star networks without stand-alone hubs, the company said.

The product combines an Arcnet board and a five-port hub to provide users with four free active ports that can be connected to four Arcnet workstations up to 2,000 ft away.

Using inexpensive passive hubs, each active port is additionally capable of connecting to three other Arcnet workstations within 100 ft.

A-Net costs $395.

Compex, Unit H, 4075 E. La-Palma, Anaheim, Calif. 92807. 714-630-3382.

Xyplex, Inc. has expanded its Maxserver terminal family with the addition of the **Maxserver TM 4500.**

The product works in conjunction with the company's Advanced Network Management software and will connect up to 32 users, the vendor said. Offered as an entry-level product, the unit combines uninterrupted service with local- and wide-area networks for Digital Equipment Corp. VAX/VMS systems. The server also supports any system running Transmission Control Protocol/Internet Protocol software.

The basic Maxserver with an Ethernet connection costs $3,995. An eight-port terminal server card costs $1,395.

Xyplex, 100 Domino Drive, Concord, Mass. 01742. 617-371-1400.

Two intelligent multiuser boards for IBM Personal Computer ATs, Personal System/2s and compatible machines have been announced by **Arnet Corp.**

The 10-MHz **Smartport/2** serial controller board is available in either eight or 16-port versions and runs in the IBM PS/2 Models 50, 60, 70 and 80, the vendor said. Smartport/2 costs $2,195.

The PC AT-compatible **Modular Smartport** product is said to be a serial communications controller board that incorporates telephone-style connectors. It is priced at $1,295.

Both boards are scheduled to be available this month, according to the vendor.

Arnet, No. 6, 618 Grassmere Park Drive, Nashville, Tenn. 37211. 800-366-8844.

Tiara Computer Systems, Inc. has introduced a half-size Arcnet card that fits into any slot of the IBM Personal Computer, PC XT, AT and compatible computers.

Called the **Lancard/A PC**, the product features configuration switches that allow for full compatibility with virtually all personal computers and PC-based Arcnet networks, the vendor said.

The card carries a suggested retail price of $240 and comes with a lifetime warranty, according to Tiara.

Tiara, 2700 Garcia Ave., Mountain View, Calif. 94043. 415-965-2677.

Local-area networking software

Highland Digital is now shipping **Network License Manager.** The product reportedly allows networked Unix workstations to share proprietary licensed application software over an Ethernet network without violating the one-license, one-workstation rule, the company said.

Network License Manager is a Unix utility that was designed to be built into application developer's products and acts as a server on the network to control various application packages from multiple vendors.

The product also offers support for layered application software.

According to the vendor, the Network License Manager costs $10,000 for binaries. Source code is available on a demand-quote basis.

Highland Digital, 940 E. Meadow Drive, Palo Alto, Calif. 94303. 415-493-8550.

Network Research Corp., a Transmission Control Protocol/Internet Protocol vendor, has announced its support for the recently released Western Digital Corp. Ethernet adapter for IBM's Micro Channel bus Personal System/2 systems.

The company is offering its **Fusion and Network Software** in a bundled package with the Western Digital adapter, which will support Micro Channel PS/2 Models 50 and 60 for the Microsoft Corp. MS-DOS operating system.

An unbundled version of the software is available for $300.

Network Research, 2380 N. Rose Ave., Oxnard, Calif. 93030. 805-485-2700.

A networked version of **Wordperfect 5.0** is available and currently shipping, according to **Wordperfect Corp.**

The product includes several features for network users, such as a master document and document-compare functions.

The master document facility reportedly simplifies the editing of large documents by combining several files into one, while the document-compare function compares and revises a document on screen, phrase by phrase, with an existing file on disk.

Each network workstation using Version 5.0 requires 384K bytes of available memory and DOS 2.0 or higher.

The Wordperfect 5.0 personal computer local-area network costs $695 for the file server and $150 for each additional workstation.

Wordperfect, 1555 N. Technology Way, Orem, Utah 84057. 801-227-4433.

Server Technology, Inc. recently announced a proprietary version of its Easylan local-area network software for use on Northern Telecom, Inc.'s Meridian SL-1 Public Branch Exchange systems.

Called **Easylan with Meridian Extension**, the software will give SL-1 users access to laser printers, plotters, tape-backup units and other shared personal computer resources, according to Server Technology.

Files may be transferred across the network at speeds up to 19.2K bit/sec., the vendor said.

The menu-driven program reportedly supports IBM Personal Computers, PC ATs, Personal System/2s and compatible systems.

According to the vendor, Easylan with Meridian Extension is priced at $199 per PC.

Server Technology, 140 Kifer Court, Sunnyvale, Calif. 94086. 408-738-8377.

Network management

A series of programmable backbone switches and network control centers has been introduced by **Telematics International, Inc.**

Called the **Series 4000 Programmable Communications Processors**, the units are based on Motorola, Inc. 68020 microprocessor technology.

The products employ dual-processor architecture, and they provide a nodal throughput of 800 packet/sec., the vendor said.

The series also offers 256 bytes of on-chip cache memory and a clock speed of 16 MHz.

The Series 4000 is priced from $38,250 to $86,150, depending on the model and the configuration.

Telematics International, 1415 N.W. 62nd St., Ft. Lauderdale, Fla. 305-772-3070.

Micom-Interlan, Inc. has announced a network management package that operates with the company's IB30000 family of internetworking bridges.

Based on proposed IEEE 802.1 network management standards, the **Bridge Management Station** reportedly features a command-script language that allows operators to create configuration files.

According to the vendor, other frequently performed routines in command files can also be stored on disk.

The Bridge Management Station software costs $1,295.

Micom-Interlan, 155 Swanson Road, Boxboro, Mass. 01719. 508-263-8655.

The latest versions of **Network General Corp.'s** Sniffer will perform protocol analysis and diagnostics for **Sytek, Inc.'s** broadband network products, which include the Localnet 6000 and IBM Personal Computer Network, the two companies announced.

Sytek will resell the Sniffer as part of its product line. One new Sniffer release is said to monitor and collect network protocol information on Sytek's 2M bit/sec. broadband PC Network running a variety of protocols, including Banyan Systems, Inc.'s Virtual Networking Software, Novell, Inc.'s Netware, PC Network, Digital Equipment Corp.'s Decnet and Transmission Control Protocol/Internet Protocol.

The other version supports Localnet 6000, Sytek's broadband terminal-to-host local-area network. Sniffer pricing ranges from $15,750 for the Laptop 300 Series to $24,000 for the Portable 500 Series. Add-on protocol interpreters are priced from $995 to $1,995.

Sytek, 1225 Charleston Road, Mountain View, Calif. 94043. 415-966-7300.

A family of personal computer-based network management systems for the T1 environment has been announced by **Coastcom Co.**

Called the **NCC 2** and **NCC 3**, the systems reportedly enable users to monitor, control and reconfigure multiple remote

Coastcom multiplexers and digital cross-connects via modems and the Public Switched Network.

The NCC 2, designed for smaller point-to-point networks, is priced at less than $1,000 and is shipping immediately. The NCC 3, with an automatic polling function for larger networks, is scheduled for delivery in the second quarter of 1989, according to the vendor. Pricing has not yet been determined.

Coastcom, 2312 Stanwell Drive, Concord, Calif. 94527. 415-825-7500.

Links

Wespercorp has introduced computer networking and peripheral sharing devices designed to help minimize equipment expenditures by allowing users with multiple desktop computers to transfer files and share peripherals across a variety of vendor environments.

Focalpoint and **Focalpoint Plus** are being marketed through value-added resellers and dealers and, according to the company, provide a cost-efficient and effective hardware solution for integrating computer systems.

The products adhere to both RS-232C serial and Centronics Data Computer Corp. parallel interface standards for connecting microcomputers, modems and printers.

Focalpoint, *Focalpoint Plus*

Focalpoint Plus is machine-independent and is compatible with all major computer environments, including the IBM Personal Computer AT, the Apple Computer, Inc. Macintosh, the Digital Equipment Corp. VAX/VMS systems and computers that utilize the Unix operating system.

When used in conjunction with existing local-area networks, Focalpoint Plus reportedly removes printing-delay deadlocks and allows support of multiple printers through a single-system port.

Both products come with 256K bytes of standard buffering memory, which is expandable to 1M byte.

Focalpoint is priced from $600 to $995 per unit; Focalpoint Plus costs from $750 to $1,175 per unit. Pricing depends upon memory configuration.

Wespercorp, 1821 E. Dyer Road, Santa Ana, Calif. 92705. 714-261-0606.

Torus Systems, Inc. has announced a connectivity software that allows its Tapestry II network users access to Transmission Control Protocol/Internet Protocol (TCP/IP) applications, the company said.

The TCP/IP implementation reportedly includes file-transfer and wide-area mail capabilities. The software runs on the Torus Ethernet Plus adapter and the Torus Ethernet Plus adapter/MC for IBM's Micro Channel.

The **Torus TCP/IP Workstation Pack** is priced at $295.

Torus Systems, 240B Twin Dolphin Drive, Redwood City, Calif. 94065. 415-594-9336.

Pacer Software, Inc. has announced a major upgrade for its IBM Personal Computer to Digital Equipment Corp. VAX connectivity software.

Version 5.2 of Pacerlink, for IBM PCs, PC XTs, ATs, Personal System/2s and compatibles, lets users on Apple Computer, Inc. Localtalk networks communicate with a DEC VAX/VMS host. The software also provides multiwindow terminal emulation for personal computer users on all supported media, the vendor said.

Pricing is based on number of concurrent sessions and starts at $2,000 per VAX.

Pacer Software, Suite 402, 7911 Herschel Ave., La Jolla, Calif. 92037. 619-454-0565.

An asynchronous local-area network redirector that extends network gateway capabilities to stand-alone personal computers has been announced by **Techland Bluelynx.**

The **Bluelynx/5250 Redirector** works in conjunction with the company's 5250 gateway packages in both local and remote settings.

According to the vendor, up to nine stand-alone PCs and IBM Personal System/2s can have access to all 5250 node functions when linked to the network via the Redirector.

The Bluelynx/5250 Redirector costs $495.

Techland Bluelynx, P.O. Box 335, Friendsville, Md. 21531. 301-746-5888.

A personal computer application software that supports multiuser PC database applications on a Digital Equipment Corp. VAX machine has been introduced by **Virtual Microsystems, Inc.**

Called **V-Server/Networks,** or VS/NET, the product reportedly allows users to set up one or more of their Microsoft Corp. MS-DOS drives to map into DEC VMS directories on the VAX.

Virtual Microsystems, Suite 700, 1825 S. Grant St., San Mateo, Calif. 94402. 415-573-9596.

Xyquest, Inc. has announced a networked version of its **Xywrite III Plus** word processing package for IBM Personal Computers and compatible systems.

Designed specifically for a work group environment, the product supports DOS 3.0 file locking and access restrictions for specific network drives. Spell-checkers, control-print fonts and help screens are also included.

Xywrite III Plus for Networks is priced at $795 for the File Server version and $195 per node version.

Xyquest, 44 Manning Rd., Billerica, Mass. 01821. 508-671-0888.

An integrated electronic mail and facsimile gateway product has been introduced by **Compfax Software International, Inc.**

Dubbed **Faxway,** the product reportedly allows local-area network users to send E-mail, spreadsheets, word processing documents or graphics files to any other Group III facsimile machine.

The product reportedly runs on IBM Personal Computers and compatible systems. Faxway software carries a price tag of $995.

Compfax, Suite 2574, 175 Fifth Ave., New York, N.Y. 10010. 212-643-9156.

Harris Corp. has announced the **Harris Supernet Series,** a family of networking products based on the Intel Corp. 80386 processor running the AT&T Unix System V operating system.

The **Harris Supernet Super Gateway** is reported to be a high-end personal computer local-area network designed to provide PC communication capabilities for both IBM Token-Ring and Ethernet LANs.

The **Harris Supernet Super Controller** is an advanced IBM 3270 controller that supports both Coaxial A and ASCII devices, the vendor said.

According to the vendor, pricing for both the Harris Supernet Super Gateway and the Harris Supernet Super Controller will vary depending on system configuration and customer options.

Harris, Data Communications Division, 16001 Dallas Pkwy., Dallas, Texas 75248. 214-386-2000.

QMS, Inc. has introduced a communications controller that allows QMS printers to be directly attached to IEEE 802.3 Ethernet Transmission Control Protocol/Internet Protocol networks.

Each **Printlink** controller includes an Intel Corp. 80286 12.5-MHz processor, a 20M-byte print-job spooler, a user console and a 3½-in. floppy disk drive for software upgrades. Host software is not required for operation.

Printlink costs from $3,250.

QMS, P.O. Box 81250, Mobile, Ala. 36689. 205-633-4300.

Comserv, Inc. has developed an Ethernet thin-wire cabling system that is reportedly capable of sending data at 10M bits over unshielded twisted-pair cable.

Components include the proprietary **THN-11 Balun,** which supports transmission up to 750 ft per node on a star-wiring configuration for the multiport repeater, and proprietary local-area network distribution panels, which provide connections for up to 100 two-wire locations per unit.

Panel dimensions are 7-in. high by 19-in. wide by 3¼-in. deep.

According to the vendor, the product can be mounted in a 19-in. relay rack, and the unit list price of the THN-11 Balun is $100.

The company has also announced the **6 Port Twinax Star Panel** for use in the IBM Type 1 and 2 cabling systems. Each panel is said to support up to 42 twin-axial devices and provide total random access or remote locations to any host port.

The panel reportedly measures 10½-in. high by 19-in. wide by 3¼-in. deep.

The product contains a full directory for cable management.

According to the vendor, the 6 Port Twinax Star Panel costs $200 per port.

Comserv, P.O. Box 8205, 550 Frontage Road, Northfield, Ill. 60093. 312-446-5750.

Electronic mail

Starx Technology, Inc. has released a communications product for the Unix and Xenix marketplaces.

Called **Com/Ment**, the package is an electronic mail information-exchange system that reportedly will provide companies with an alternative to more complex commercial networks, the company said. The system sends binary and text data and executes remote applications. The product is said to support most popular terminal emulation products and dumb terminals.

Com/Ment costs $400 for an entry-level version.

Starx Technology, 1201 Flower St., Bakersfield, Calif. 93305. 805-324-6041.

OA Technologies, Inc. has released a new version of its **Oatmail** software for connecting personal computer workstations to Digital Equipment Corp. mail systems. **Version 2.20** is said to provide a PC-based interface to DEC's All-In-1, VMS Mail and Mailbus.

The product is priced from $100 to $300, depending on quantity.

OA Technologies, 1001 Craig Road, St. Louis, Mo. 63146. 314-432-3622.

Modems/ Multiplexers

NEC America, Inc. has introduced a series of intelligent data communications products. Dubbed the **I-Series**, the product line encompasses chassis, controllers, subcontrollers and modems, the vendor said.

The **I1000 Intelligent Chassis** was designed to provide users with central-site control of data communications products. It reportedly can be custom-tailored with the addition of a controller or subcontroller, and modems can be intermixed in the same chassis regardless of application requirements. It costs $1,200.

The **I1001 Intelligent Controller** is said to link I-Series data communications products in the system and allow them to communicate. Through the controller, users can set options and modem configurations and test and monitor any other I-Series component. It can be connected to 15 other chassis via a daisy chain to provide control for up to 504 modems. It costs $35.

The **I1002 Subcontroller** provides a communications path from the controller to each sub-chassis system. Features include password-protected remote-access and channel-control bit error testing. The T1002 is available for $165.

The company has also introduced two stand-alone modems: the **N2431C** and the **N2431**. The N2431C supports 2,400, 1,200 and 300 bit/sec. transactions and includes Hayes Microcomputer Products, Inc. and NEC Information Systems, Inc. autodialers. It costs $695.

The N2431 operates at the same transaction speeds and includes Hayes and NEC autodialers. The N2431 costs $575.

NEC America, Data Communications Products Division, 110 Rio Robles, San Jose, Calif. 95134. 800-222-4632.
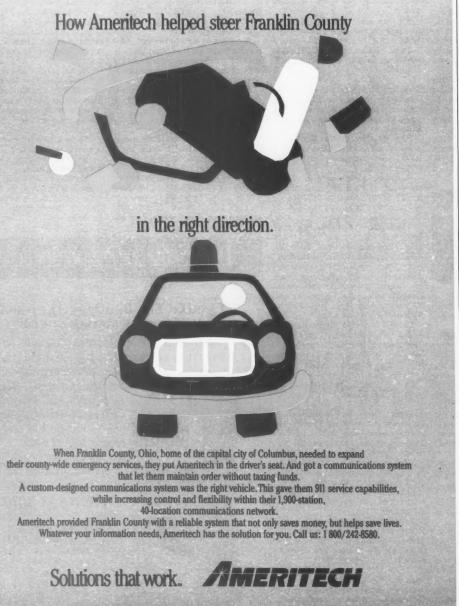
Infotron Systems Corp. has unveiled what is said to be the first commercial T3 multiplexer, which will support 45M bit/sec data rates.

Streamline 45 reportedly supports drop-and-insert communications for up to 28 1.5M bit/sec. T1 links or 672 56K bit/ sec. DS0 links. This feature allows it to act as a concentration point that collects transmissions from multiple sites and sends them on to another address, saving users the cost of multiple T1 access charges, the vendor indicated.

Streamline 45 features hot standby and redundant T3 and T1 interfaces for increased reliability. The product can reportedly interoperate with Infotron's Infostream NX T1/E1 switch and 990NP access product. It can be managed by Infotron's Advanced Network Manager 45 or Integrated Network Manager.

Pricing for Streamline 45 starts at $25,000 per unit. Delivery time is reportedly 90 days.

Infotron Systems, Building 9, Cherry Hill Industrial Center, Cherry Hill, N.J. 08003. 609-424-9400.
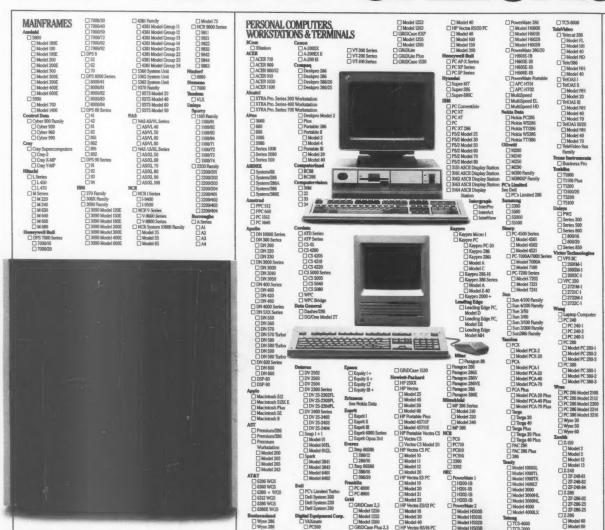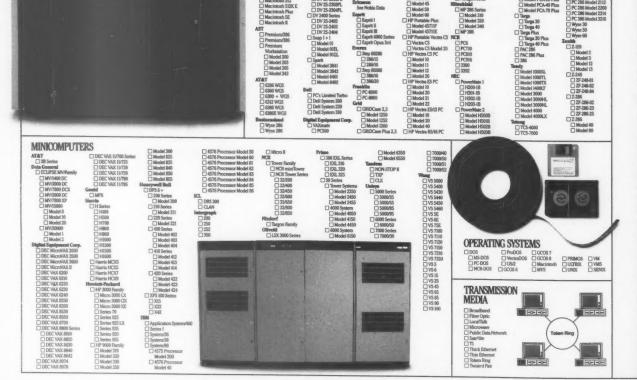
HOW MANY CHECKS WILL IT TAKE TO NETWORK YOUR ENTIRE COMPANY?

Control of large networks no dog-and-pony show

BY DAVID GABEL

The job of a corporate communications manager is one that evokes vivid images. Some compare it with being a ringmaster in a three-ring circus. Others call on battlefield terminology, referring to the person in charge of coordinating networks as a field marshal. Stan Welland, manager of corporate telecommunications at General Electric Co. in Bridgeport, Conn., sees himself as managing "the arterial system of the company."
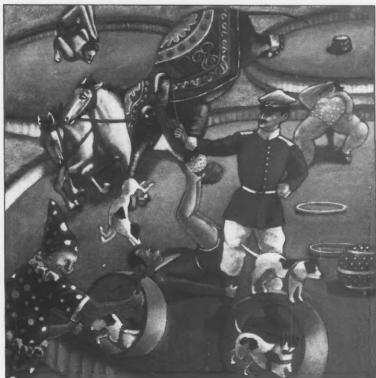
At GE, Welland manages a voice/data network that runs 24 hours a day, seven days a week, requiring constant oversight and maintenance availability.

The network, with between 1,000 and 1,200 locations in the U.S., employs both Centrex and other private branch exchanges (PBX) and uses the services of AT&T, MCI Communications Corp. and other carriers. The backbone is digital, as is, in fact, most of the entire network. It includes, in Welland's words, "a mix of every inter-LATA and interexchange carrier that there can be. The company couldn't function without it."

And as the importance of the network increases, so does the importance of the network manager.

Someone has to keep these networks running. Someone has to plan for their expansion, which includes when to integrate new hardware and software into the networks. Someone has to ensure that users have the access they need. And at the same time, these users must be restricted from too much access, which, if granted, could result in the compromise of sensitive information. Someone also has to make sure that the network is free from unauthorized entry. In short, someone has to manage these networks, a role that has become a premier task in the hi-

Gabel is a free-lance writer and former data center manager based in Northport, N.Y.

erarchy of corporate activities.

The role of the communications manager in a company used to be more of an administrator than of a technical manager. Typically, the communications management function was lumped in with other facilities kinds of tasks, and the communications

equipment was located in the closet down the hall.

"In the early '80s," Welland says, "the communications guy was no more than a facilities manager. He was not technical at all — he relied on AT&T for technical support.

"Since divestiture, the tele-

communications manager has to be more self-reliant," he adds. Now, there are more vendors, and the business is more complex. The manager has to be more knowledgeable and have more technical involvement. Now, he can play a major role in controlling costs; he has a major

CAROL O'MALIA

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Managing

FROM PRECEDING PAGE

business responsibility. And as companies become more global, he picks up international responsibility. He has become a major player in the overall actions of his business."

Jeffrey Held, a consultant at Network Strategies in Fairfax, Va., says he has seen these very things happening in companies. And he says it's sometimes causing problems for network managers.

"A lot of network managers come up through the ranks," he explains, "and they may not have the capability or the background to deal with top management. Many of the network managers that we see are very good technically, but they lack the background to deal with strategic issues."

He says this leads to a kind of mirror-image frustration in many companies. The top management of the company says it cannot get information from the technical communications manager. The manager, for his part, complains that top management just doesn't understand what needs to be done for the communications needs of the company.

"The communications man-

GE's Welland

loads either a portion of the network or the entire system. When any of these troubles occur, the network manager must be aware of the problem, be able to identify its nature and determine where in the network it exists. Most importantly, the manager must know how to fix the problem, either by calling in vendor maintenance, for example, or by reassigning users to different machines.

Once the problem is diagnosed, taking control of the situation is the next step. If there is a fault in hardware or software that someone must fix, the manager must track that repair activity.

Network control and diagnostics "are two of the most critical issues because everyone is multivendor," says Harvey Hershkowitz, a Caldwell, N.J., network consultant. "More and more, networks must stay operational, and the manager doesn't have [just] one vendor to go to if there is trouble."

While standards for control and diagnostics, such as IBM's Netview and announced products from AT&T and Digital Equipment Corp., are on their way, equipment to control and diagnose the entire network is not yet available. Instead, managers must track what is going on. In some cases, a manager

Looming concerns

Ten issues that give network managers headaches

- ✓ Migration to new technologies without losing investment in installed equipment
- ✓ Migration to OSI
- ✓ Distributed vs. centralized network design
- ✓ Upper level connectivity for software applications
- ✓ Security and backup
- ✓ Multivendor integration
- ✓ Macintosh integration into DOS environments
- ✓ Minicomputer vs. PC LAN solutions
- ✓ More powerful and automated network management tools
- ✓ Reduction of total number of vendors in network

SOURCE: INTERNATIONAL DATA CORP.
CW CHART

ager should start thinking in a different way," he says. "He has to think like a businessman, not like a techie. He has to put himself in the place of the guy he's talking with."

Jack-of-all-trades

The job of a network manager requires vigilance over a number of different basic functions. These include the following:

● **Control and diagnostics.** A variety of problems can crop up in telecommunications networks: the network breaks, ports slow down or traffic over-

may not know a problem exists until users call it in.

● **Administration.** Administering the network — deciding who and how many users should have access — is another key role of a network manager. Administrative functions range from access control, such as passwords and access codes, to billing and other chargeback activities.

● **Configuration management.** Configuration management can become a chore, especially when multiple vendors are supplying the hardware and software used to run the network.

And as more voice networks turn digital — essentially becoming data communications networks that take voice and turn it into data — configuration management becomes a critical issue for voice networks as well.

Configuration management takes into account the actual layout of the network, a factor that can greatly affect the bottom line, as well as planning. The network manager should be aware of any changing data communications requirements within the organization; he can then determine how the network can best meet those needs.

● **Performance measurement.** Measuring the network's performance requires constant monitoring to ensure that it is operating as it should, with no slowdowns, and, at the same time, that it is not running idle much of the time.

If performance measurement shows that the network is slowing down or that added users have caused some problem at a critical point, it may be time to plan for network expansion.

In network management, overseeing these basic functions only scratches the surface. Network managers are the quintessential firemen: Telecommunications network priorities and problems require that they are always prepared to put out the biggest fire first. And, indeed, this seems to be where network management software vendors are concentrating their focus: on tools that make it easy to keep networks running — to identify, locate and diagnose problems.

Keeping ahead of fires

In this kind of environment, other management functions may take a backseat. But if managers are to put some sense into running a corporate telecommunications system, they need to be able to extend themselves beyond the technical to more traditional managerial tasks, such as organizing, planning, executing and supervising.

Networks in use today vary from simple local-area networks to huge wide-area networks involving leased lines, packet-switched data lines, fiber-optic backbones, IBM Systems Network Architecture (SNA) networks and dial-up modem access to a central computer. Networks handle voice and data communications in a variety of ways, including leased T1-carrier multiplexed voice and data channels, microwave communications links and even very small-aperture terminal (VSAT) satellite communications systems, which provide relatively inexpensive private or shared satellite communications services to private users.

In most organizations, the vehicle for network control has evolved into a central organizational entity, typically called the network control center. Indeed,

Must-haves

What network managers want from network management systems

✓	Maximized network uptime
✓	Low terminal response times
✓	Security
✓	Software management
✓	Problem determination and diagnostics
✓	Configuration management for adds, moves and changes
✓	Automation of system responses to alarms
✓	Performance measurement for testing remote devices
✓	Message filtering
✓	Standards support: IBM's Netview and the ISO's OSI

SOURCE: INTERNATIONAL DATA CORP.
CW CHART

it seems that there is little local management in corporate telecommunications networks today. There is local input at the planning phase of network management, but the actual control is centralized.

A network control center is the central location at which the network's status is always known. The people who oversee the daily management of the network work there, and the equipment used to determine the network's ongoing status is housed at the center. The equipment used can be a stand-alone management system or software running within the network and reporting to a central location.

"Our network operations center," Welland says, "has an analysis section where, when a problem comes to the operations center, we can decide where the problem is, and we can do something about it."

Frito-Lay's Lusk

Alan Lusk, network systems manager at Frito-Lay, Inc. in Plano, Texas, says it makes sense to centralize the control of the center for his company. Lusk oversees an SNA network that involves about 300 locations. He says Frito-Lay keeps the network standard simple because it has good control over the hardware in both company headquarters and remote locations.

"We got into this business when PCs just started hitting the world," he says, "and we just kind of made it easy for [the users] to order their equipment through us. They need host-file access, and we essentially sell that to the field departments. We provide a common interface and bill them for the services."

Because the central MIS organization had control of computing hardware from the beginning, a lot of the same equipment

is used from site to site.

"The equipment is so common that we can leverage that commonality for the economic good of the corporation," he explains. "If you compare the economics of the central organization with having some data processing people in each plant, then clearly it's less expensive to manage the network with five or 10 in our central location."

Because Lusk's network is strictly IBM, when a problem exists, control people can determine the location of the problem and dispatch IBM maintenance to that site.

Peter Skepsted, technical manager at the Quantum Division of Travelers Express, Inc. in Minneapolis, is involved in further consolidating control of his network.
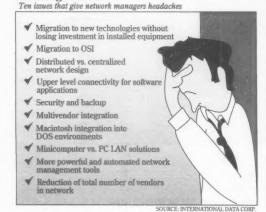
Its six packet-switched nodes are in different locations from Washington, D.C., to Minneapolis, where the central network control center is located.

Quantum operates a private automated teller machine (ATM) network that provides ATM services for small banks in various locations around the country. Large banks have their own ATM networks, but smaller financial institutions that do not have the resources to establish such networks can still offer ATM service for customers by using an organization like Quantum. Skepsted says managing his network involves common difficulties; the network's nature requires that he deal with a number of different vendors.

"Our intent is to make the nodes as unattended as possible," he says, which is why Quantum is moving toward centralized control.

But planning for this move is another matter. "We have a formal structure for planning,"

Frito-Lay's Lusk says. "Manufacturing, sales, marketing and distribution all report to senior managers at corporate headquarters. Within each functional area, we have a coordinator who interfaces with us and helps do their business. Because of this, MIS has a good understanding of the business and can drive a lot of the [communications] integration."

Planning is also a never-ending activity in network management. At California State University in Los Angeles, the university's recently installed communications network consists of LANs, a fiber-optic data backbone for high-speed transmission between the networks and digital PBXs to handle the university's voice traffic. According to James Penrod, the university's vice-president of information resources management, the network presently serves some 1,600 voice users and 300 data users, a figure that he expects to increase in the coming years.

California State's network has just been installed in cooperation with Rockville, Md.-based Centel Information Systems, a large telecommunications systems integrator; Penrod says there is definitely more to do.
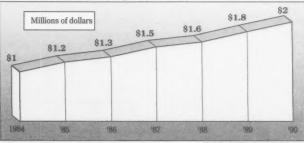
"Our final goal is to have all the full-time faculty and all the classrooms, labs and administrative areas on the network in three to five years," he says. "But right now, our goal is to make sure the network is up and running, which is especially critical for administrative services. We are developing applications that bring a totally integrated system to the user, which, with ease of use, is critical to getting a lot of people to really use it."

However, planning for a telecommunications network involves more than just

The investment curve

Budgets for data communications equipment in the top 1,000 U.S. corporations are projected to double their 1984 levels by 1990

Millions of dollars

1984	'85	'86	'87	'88	'89	'90
$1	$1.2	$1.3	$1.5	$1.6	$1.8	$2

SOURCE: NEWTON-EVANS RESEARCH CO.

Budget appeal

Marketing is more than half the battle in getting a communications budget approved, according to David Bilodeau, telecommunications manager at Alex Brown & Sons, Inc. in Timonium, Md. Expenditure proposals won't make it off the shelf unless you know how to appeal to business managers. Here are a few of his tips on how to make spending more palatable to company executives:

• Learn the business vernacular and use it. Don't talk about the fine points of T1 technology but about what the equipment could mean in terms of return on investment.

• Relate the technology to a definable business objective, such as a new product or service development.

• Do your homework on what the organization's business competitors are investing in. Your proposals will get a lot more attention if you can point to a rival who has done what you are suggesting.

• Line up sponsors for your equipment proposals. What you say will carry more weight if you have one or more department heads testify that they need the technology.

• Tailor your budget to the prevailing climate in your industry. If you show sensitivity about economic conditions, applying the brakes voluntarily during lean times, you will be taken more seriously over the long term.

• Be prepared to name numbers. If you are asking for more staff, make sure you can point to exact points where understaffing is delaying projects or where the salary investment would be balanced by savings.

• Practice the fine art of compromise. You are more likely to get at least part of what you need if you exhibit flexibility.

"If you're running critical analog private-line applications, you'd be crazy not to have an APL modem that's second to none."

—Patricia Thomas, AT&T National Account Manager

"AT&T's analog private-line modems have a mean time to failure rate of up to 12 years. Second to none.

They have self-diagnostic systems, so they can report problems as they occur, and the problems can be resolved.

If there's trouble on the line, our modems can report it automatically to an AT&T Data Maintenance and Operation Control Center (DataMOCC), so that disrupted service can be restored before it affects your business.

You can get automatic dial backup capability, so if there are problems on your private line, you're automatically connected to the switched network. This means you can eliminate the need for a second, backup private line.

These are AT&T analog private-line modems, designed specifically to work with the AT&T Network and as reliable as the network itself.

For virtually flawless, reliable data transmission, there's no better combination.

If your data transmission is critical to the profitability of your company, you can't afford anything else."

For more information about AT&T analog private-line modems, see your AT&T Account Executive, your authorized AT&T reseller or call **1 800 247-1212, ext. 718.** In Canada, call **1 800 387-6100.**

AT&T
The right choice.

Forget old recipes when mixing media

BY JOSH BRACKETT

Designing and installing an integrated voice, data and video network for a widespread organization requires expertise in all three technologies, according to Mark Waldschmidt, director of network services at Science Application International Corp. (SAI). Waldschmidt, who is completing the design of such a network, says, "You can't just talk to experts in each individual field unless *you're* going to be the total expert."

And, he adds, if that is the case, you have to be willing to undertake total immersion, not just a surface skim. If you try learning just enough about a couple of the specialties to be able to oversee others on those parts of the project, the system can

ANY COMPANY considering voice, video and data integration must keep an open mind.

wind up costing too much or not working at all.

SAI is an $800 million research and development firm that also does systems integration, mostly under contract for the federal government.

The company has 9,000 employees: about 2,200 work in each of its two hub offices in McLean, Va., and San Diego, and the rest are stationed in 175 field offices located near federal agencies throughout the country.

Two of SAI's biggest current systems integration projects are a $500 million system for the Department of Energy's nuclear waste program in Nevada and a $1 billion medical information system for the U.S. Department of Defense's hospitals.

It was SAI's own experience with unifying three separate streams of network traffic that got it started in the network integration business.

"What started as 'Let's network a bunch of computers together so we can do things' advanced itself strategically into an important part of the business," explains Jeff Smith, vice-president of telecommunications at SAI.

But before SAI could capitalize on its knowledge of the integration business, it learned about integration the old-fashioned way — by doing it itself first. In hindsight, Smith says, any company considering voice, video and data integration must keep an open mind.

"When you put something like this in, don't limit your horizons on what you can put on there," he says. "You can start looking at some of the strategic parts of your business if you have a facility or an infrastructure in place to do that. That's what we really wound up getting out of it."

Keeping the door open for additional

Brackett is a free-lance writer based in Rockport, Mass.

growth is also key.

"Understand the strategic importance of the network and don't limit your ability to grow the network, add new technologies and add more users," Smith says. "We wound up using the network in a variety of ways that we originally didn't plan for. And had we limited ourselves in the way we designed it, we would not have been able to achieve what we did."

Four years ago, Waldschmidt and his colleagues realized that they were either installing or adding to separate communications lines for two data networks and one video network.

"We were going to have to have three different communications lines, separate 9.6K bit/sec. lines for each of those applications. But none of those applications really needed all that capacity," he says.

The early stages

The network began to take shape in 1982 after SAI installed an IBM 4341 mainframe in a new data center in Mission Valley, Calif. The new center was 15 miles from its San Diego headquarters, where most of the data was to be entered. To support remote terminals, dedicated 9.6K bit/sec. lines were installed and tied into IBM 3274 communications cluster controllers.

Soon afterward, Waldschmidt and his colleagues began looking at the future of SAI's MIS department, which handles the company's financial, human resources and project management information.

The company decided to decentralize as MIS grew. To eliminate paper forms, data could be captured close to the source, they concluded. For that purpose, a large communications network was inevitable.

The only question, Waldschmidt says, was how to implement it. "How do you support terminals coming in from all over the country to a central 4341 near San Diego?" he asked himself.

Most of the company's major locations

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were using Digital Equipment Corp. VAXs for technical computing.

"The hot item at that time was Decnet," Waldschmidt recalls. "So we were going to connect the VAXs using Decnet, put an IBM gateway in San Diego and use the 'set host' facility of Decnet" to route users through to the IBM mainframe. The IBM gateway did the protocol conversion from ASCII to EBCDIC.

The tricky part

One of the trickiest aspects of designing a network, Waldschmidt discovered, was working with users — trying to predict what they are going to need and when they will need it.

"They really had a hard time telling you that," he says.

O NE OF THE trickiest aspects of designing a network, Waldschmidt discovered, was working with users — trying to predict what they are going to need and when they will need it.

As SAI got used to the network, emphasis shifted from MIS to the communications needs of the company's professionals, which include managers, administrators, systems analysts, programmers, scientists and technicians trained in a variety of disciplines.

These staff members, expecially those at the two main hubs in San Diego and McLean, needed to be able to communicate across a variety of machine models and makes via electronic mail and electronic file transfer.

The original Decnet was made up of dedicated 9.6K bit/sec. circuits connecting five locations: McLean, Oak Ridge, Tenn., Huntsville, Ala., La Jolla, Calif., and San Diego. It soon became evident that one set host procedure took up most of the capacity of a 9.6K bit/sec. line, de-

grading response time for other users unacceptably.

With 60 to 100 remote users signing on at one time — and the possibility of as many as 30 at once — SAI needed other ways of getting into the IBM mainframes, now located in McLean and Huntsville as well as near San Diego. Furthermore, for data entry, a clear bisynchronous IBM terminal-to-IBM mainframe link was preferable to protocol conversion.

While the data networks were being built, SAI had been developing a third coast-to-coast communications network for in-house videoconferencing.

At the outset, the video setup was quite primitive. The system only transmitted still pictures, which took about 90 seconds to send.

Today's system transmits high-quality video and audio. Meeting attendees, regardless of where they're located, see two large screens with full motion in real time. One screen shows the speaker; the other displays whatever graphics the speaker is using to illustrate the presentation.

Waldschmidt

The speaker's site has full-duplex audio and video communications for questions and feedback with the remote sites; it can switch from one site to another.

A coder/decoder video compressor/decompressor removes some of the redundancy from the video signal so that it requires only a 56K bit/sec. line to transmit rather than the usual 70M bit/sec.

Portable VSAT network

Videoconference signals are sent via 2.4-meter rooftop very small-aperature terminal (VSAT) satellite dishes. The transmitting and receiving equipment can be packed up in four cases and sent overnight along with an operator to any site.

The videoconferencing system is used for managerial and technical meetings of all kinds: program review boards, training and job interviews. Smith, Waldschmidt's boss, estimates that the system saves SAI $50,000 a month in travel expenses.

Face-to-face meetings still occur when necessary. SAI holds one every quarter for more than 100 of its top people. The video system, however, allows those who cannot make it in person to take part.

The company decided to install a 56K bit/sec. cross-country backbone from San Diego to McLean, initially supplied by AT&T and currently distributed by Western Union Corp.

Statistical multiplexers handle the various protocols in use: Decnet, IBM bisynchronous and asynchronous terminal traffic. Simplex Datamiser II compression devices quadruple the amount of traffic each 9.6K bit/sec. line coming into the hubs can carry.

The next step in the evolution of SAI's network, Waldschmidt says, is to integrate voice traffic into it, possibly by replacing SAI's two VSAT links, which handle 112K bit/sec., with a coast-to-coast fiber-optic T1 link that will handle about 13 times as much traffic.

Eventually, the amount of voice traffic between San Diego and McLean will be sufficient to justify such a link. For now, however, this traffic is handled by common carrier. ●

Managing
CONTINUED FROM PAGE 85

planning the hardware installation. Penrod has to ensure that the data system is easy to use, in addition to making certain that the network includes digital PBXs. The staff also needs training so they can adequately use all the available features, such as voice store-and-forward.

Planning also involves deciding how many people must perform the management work. Chuck Cutler, network communications center manager at Mastercard International in St. Louis, oversees a network that consists of dial-up modems connected into various kinds of communications lines that, in turn, connect to interface processors. He has IBM equipment on both end points, various longhaul vendors and Racal-Milgo, Inc. and Racal-Vadic, Inc. modems. Cutler also manages Mastercard interface processors, located throughout the country, which control portions of the Mastercard card-verification network.

"One of the criteria I have developed," he says, "says that one person can handle a certain number of MIPS. Say that number is 20. Then if I add 60 more end points, I have just justified three more controllers, each of whom can handle 20 [IBM] Series/1 computers in the network."

Determining the optimum number of workers is a critical aspect of a network manager's job. In Cutler's case, he monitored his network and observed that its performance was slipping, which signaled a problem that needed fixing.

"We thought we were managing well a year and a half ago," he says. "In fact, we were overrun with equipment, and then we saw our availability start to slip. Actually, it had leveled or slipped slightly. I reviewed my management reports and saw that past a certain point, with each addition of equipment, availability decreased. So I just backtracked to the peak and established the ratio of people and equipment from that point."

A watchful eye
Cutler's management reports came from gathering data while the network was operating. Such data gathering about the network's performance is accomplished as much by the people who run the network as by the management systems that vendors push into the market.

"You need to monitor the network all the time to ensure line quality," Quantum's Skepsted says.
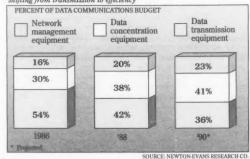
GE's Welland adds that managers "constantly look at the network to make maximum use of the design. In hardware, for example, you want to make sure you don't have a D-4 [channel] bank out there with only 10% usage. You need maximum efficiency, but enough capacity, to meet your peak load."

He explains that his circuit-monitoring personnel keep track of how the network is performing, but the network currently has no rate monitors to warn of a slow-

down in operations.

"Over time, the efficiency goes out of a network," he says. "You have to be aware of it, the way that you are with a car. If you don't monitor your engine, then slowly it won't deliver the same performance it did before. Our people are constantly going back and evaluating the network."

The network will run as long as people use it, and it is in good condition. Efficient operation will ensure that operational costs are as low as possible, a real concern for those watching the bottom line.

But how does a manager watch out for that? Skepsted says cost control comes from design and ongoing operations. People are a major part of the costs of running the network, which is one reason for the prevalence of central management — it requires fewer people.

Lusk notes that he controls costs by centralizing the purchase of equipment.

"We have control there at a fairly high level," he says. "If a plant manager needs a new PBX, then part of my group con-

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Change of focus

The emphasis in data communications equipment spending is shifting from transmission to efficiency

PERCENT OF DATA COMMUNICATIONS BUDGET

	Network management equipment	Data concentration equipment	Data transmission equipment
1986	16% / 30% / 54%	20% / 38% / 42%	23% / 41% / 36%

'88

'90*

* Projected

SOURCE: NEWTON-EVANS RESEARCH CO.
CW CHART

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sults to draw up the [request for proposal], gets the lease and so forth."

Planning, purchasing and design are all part of network management, but keeping the operations going is just as important, which means the manager has to be involved.

"You need a lot of persistence," Cutler says, "and sometimes, you have to get downright obnoxious. I have monthly meetings with my suppliers of long-haul services. I have close cooperation with them."

Teamwork
Managerial involvement also means supervising users as well as vendors. No one person can run a network by himself. It takes a team of people with different skills — from customer relations to billing and accounting to technical people who understand the connectivity issues involved in network operations and can actually design and maintain the network.

Supervising internal as well as external people involves motivation, evaluation, promotion and proper salary administration.

Recruitment and training are key supervision issues for network managers, especially because competent people are hard to find. Mastercard's Cutler says finding people who fit into his network is a difficult task to perform and is a particular problem for his organization, in which the financial network downtime is a make-or-break situation.

"For example, the settlement between banks [at the end of a business day] involves a horrendous amount of money," he explains. "An error on our part can cost, because we are responsible for the float [the amount of money found in between banks while transactions are in process]. One mistake could cost between

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INTERVIEW

Net managers earn pinstripes

Cost containment is a never-ending battle for network managers, but according to consultant Frank Dzubeck, these former foot soldiers are learning to fight strategically and are gaining rank within the corporate power structure

Frank Dzubeck is president of Communications Network Architects, Inc., a computer and communications consulting firm based in Washington, D.C. Dzubeck's company consults with organizations on planning, design, implementation and management of large-scale networks, with a particular emphasis on cost management.

Dzubeck recently spoke with *Computerworld* Senior Editor Joanne Kelleher about the changing role and responsibilities of network managers.

What is the job of a communications manager or network manager like these days?
The skill set of the manager is changing. He's becoming more of a businessman. He is running a complex business with a lot of changing costs, some of which he cannot control unless he restructures the network.

What are the major uncontrollable costs?
Primarily, the recurring costs associated with carrier services in private networking. Access charges have gone out of sight. For example, out of every dollar allocated to private analog services, we are now spending 50 or 60 cents for access and only about 40 cents for the long haul. And this is going up. What that means is that access costs tend to be very uncontrollable now unless you try to restructure the network.

But isn't restructuring also an expensive proposition?
True. If you try to restructure the network, you get hit with another whammy — installation expenditures. Installation costs have gone up thousands of percent since divestiture.

Can't you get around that with bypass?
There are bypass options, but in certain areas, I may not want that kind of bandwidth. So I'm stuck with the fact that my last-mile charges are uncontrollable.

How do you restructure to improve your position?
As a result of what I just described, classical multidrop networks have become very expensive to operate and maintain. But on high-capacity, wideband circuitry, where you've got T1 circuits and so forth, costs have been dropping dramatically. I can buy a T1 line for effectively the cost of five digital lines.

VSAT is also becoming more popular in networking structures because they are an absolute, unequivocal last-mile bypass. You go from the premises facility, up to a satellite and down to another facility.

So one of the things that communications managers have to do is hybridize their networks to take advantage of the most cost-effective methodologies. That can be done incrementally and in ways that don't impact the day-to-day operations.

Is it really that easy to do something like that without causing disruption?
It's not easy. You've got problems coming out your ears. So you have to do it gradually, be controlled and do one hell of a lot of planning. You can't throw away what you've got, because that is the day-to-day business environment, and you have to implement the new. So it requires a bit of a magician to handle these migrations.

When you start exploring all the different options and hybridizing networks, don't you wind up creating more control complexity?
Absolutely. What you are doing is creating management difficulties for the sake of cost savings.

That's why there is so much hue and cry over things like generic management systems. Why do people want standards? So they can plug everything in together. Why do they want to do that? It's cost control.

But is that expectation a realistic one?
No. The thing everyone forgets is that there is a whole other ball game out there called profit motivation. The minute vendors become nice and homogeneous, they have nothing unique to sell.

We've talked about dealing with costs that are out of control by restructuring the networks. How about more controllable costs?
One thing that people don't look at often enough are changes in volume of use. Businesses change and activities shift so that an office that might, at one time, have been a very dense traffic point may now require a lesser grade of service. Those are the kinds of things that you have to watch for.

When people get caught up in cost cutting, it can lead to false economies. Are there economy measures that network managers should avoid?
One is switching vendors strictly on the basis of cost. Generally speaking, you get what you pay for, and when you jump like that you are taking some risks. You may lose functionality. You may lose restoral time. You may lose quality of service. Those problems may not come up, but you have to consider the possibility. You can't just look at cost reduction alone; you have to take a look at the whole equation.

Sometimes people also try to save by going through other distribution channels. Instead of buying from a vendor, they deal with the distributor directly because he gives them a better price break on smaller quantities.

What's the matter with that?
When you lose direct contact with your main vendor, you can lose flexibility. Instead of being able to call the vendor and get an extra unit in an emergency, you now have to call the distributor. And his response is likely to be, "Get me my money."

This is a particularly important issue because, in many cases, the last person to know about a new location or addition of any kind is the network manager. By the time he's told, he may have less than 30 days to pull everything together.

How about budget inflators that are overlooked?
Maintenance charges are one. A

Frank Dzubeck

lot of communications managers don't stop to realize that they may be paying monthly for service on some pieces of equipment that come under their budgets. Those costs are buried inside the budget and just keep rolling along even though the technology has moved so far ahead that that kind of coverage isn't really necessary. Equipment is now being built with very high mean time between failures and also very high warranties on new equipment. So you can actually save money by buying something new.

But what if something does go wrong?
With the savings on maintenance, you can actually afford to treat the new equipment as disposable in the sense that you can stock your own repair units.

Another good way of containing costs is to negotiate basic ordering agreements with companies.

However, in order to do that, you've got to have a

pretty good sense of your expansion rate.

Either that or you have to be a good negotiator. You shouldn't make the assumption that a company is going to walk away from business because you say that you can't buy as much as you thought. If you are a good negotiator, you are going to negotiate around that and come up with an amiable agreement for both parties.

Is that really the network manager's job?

Some corporations rely on their lawyers to do that, but I think that's a mistake. Lawyers aren't terribly proficient in this particular area of technical negotiation. They don't always know the nuances that can gain you an edge in a particular contract or the things that can gain you good bottom-line dollars.

Can you give an example of something that a network manager would see but a lawyer would not?

He would know more about hidden cost structures and prevailing practices. For example, warranties are never extended, right? But who says that you can't get an extra year's free service? That's just a little gimmick, but it turns out that all of this adds up to dollars.

Warranty management is an excellent thing. People don't do enough of it. They assume that everything has got 90 days on it. That's not true. Vendors are selling on the communications marketplace now with five-year warranties on equipment.

It sounds like what's needed is a cost-containment specialist. Are there any organizations you know of that have people dedicated to that function?

No. It turns out that that guy is the network manager. This individual who, before, was more or less a technocrat is becoming less technocratic. And even though he has to know technology, he is becoming more of a businessman.

Is he prepared for that role change?

Let's face it, right now people are in more of a firefighting mode than they are in the planning mode. The reason for that is that most networking environments are usually woefully understaffed. It's a high area of growth, and the demands that are placed upon it always exceed the personnel. But there isn't really any choice; you have to learn.

Of course, communications managers have been dealing with budgets for years. The difference is that now they have to become a little more artistic in their negotiations. They also have to make their people think more about the economic impact of technology.

You say the network manager is becoming a businessman, yet he's often the last one to know things. Has there been any move to draw these people more into the mainstream of business management?

Yes. It is happening mostly as a result of something called competitive advantage planning.

The way competitive advantage planning works [is that] a company forms a group to look at the business it is in and to assess how it can get a competitive edge using data, communications and technol-

ogy. Well, no matter what technology it chooses, communications is always a part of it. So the [communications manager] is part of that group and now knows more about what is going on businesswise in the corporation because he becomes part of this implementation methodology.

Competitive advantage planning is important because it can result in increased sales and reduced costs across all sorts of boundaries in the corporation. So, although you spend more on the network, the corporation's bottom line increases.

Are you saying that if network managers can help to increase profitability in this way, it loosens the strictures somewhat on network costs?

No. It doesn't loosen anything on that side. What happens is that, at first, top management loosens cost strictures in order to make sure the communications manager implements the plan. But as soon as it becomes a tactical and day-to-day entity, they start asking him how he can save money on it.

So what's the good news?

The fact that the communications manager is becoming a much more significant and respected individual, at least in the more sophisticated organizations. When I started in this business, the concept of managing communications was just a very low-level, subordinate entity inside the MIS organization. In the past few years, this has changed. In the long run, with the commingling of media, where you have video, voice, data and imaging all coming together, it is going to be interesting to see who becomes the more prominent figure as the businessman in the corporation — the MIS manager or the communications manager.

Are you suggesting that eventually there will be MIS departments that are run by the communications manager?

That is highly probable. A lot of MIS people are going to say that will never occur but, after all, the communications manager is the one who ties all of this together. The only thing that MIS does is provide the computer environment that attaches to the network. ●

A few words to anyone buying networking software like there's no tomorrow.

Managing

$2 and $5 million. If we dispatch the wrong vendor's maintenance people to a trouble site, we have a real problem. The pressure is high, and it's tough to find people with the competence and career orientation to fit in."

GE's Welland says his company also has to look hard for capable employees, but the situation is improving. "A year ago, I would have said the personnel situation is really bad. But since Oct. 19 [1987, when the stock market crashed], Wall Street has cut back, and there are more people available."

But while Welland's situation may have

"**C**ORPORATIONS NEED people who can look at telecommunications as a business. It requires a shift in orientation. I think you just evolve into it."

STAN WELLAND
GENERAL ELECTRIC

eased, other parts of the country are experiencing severe personnel shortages. Skepsted says DP and data communications departments are in the same boat. "You need highly qualified people. We look for the best we can get, and then we train them," he says. As a result, the only choice network managers have is to hire and train their people to take over the

various tasks of network management, which is not always easy.

Welland says GE does a lot of on-the-job training. "We don't have a lot of comfort level with, nor freedom to send people to, schools," he explains. "There are not as many schools as you'd hope, and the problem with them is that they either give their students just a little training, or

else they deliver an electrical engineer.

"But we do take advantage of courses vendors offer," he adds. "For example, Southern New England Telephone has a listing of courses we can use. It's not as effective to send someone to college in the evening. Learning communications is one thing, while a degree is something else."

While the personnel needs of network management may be difficult to meet, automated network management products offer some relief, specifically for the mechanical aspects of the job. They can help the network manager with performance monitoring as well as with diagnostic and control efforts. In this way, the manager ensures that his network is running efficiently, with enough capacity to handle peak traffic and with no slowdowns for congested applications.

IBM's Netview has the beginnings of a network management system that will allow managers to monitor a network and locate and diagnose faults. But this product is in the early stages, and more functions and capabilities are needed.

"When I get more into local-area networks," Skepsted says, "I'll need something that will provide more alarms and diagnostics. It would be like the Netview product, but a more complex version."

Quantum's Skepsted

Products from AT&T and DEC are also expected soon. But even when the best management product is delivered, even when hardware is virtually fault-free, even when cables don't get cut by trenching machines, even when VSATs have taken the place of long-haul terrestrial links, things will still go wrong.

And that's still when the network manager will earn his pay. For he now controls the lifeblood of the company.

Rubbing elbows with the boss

Indeed, both Network Strategies' Held and GE's Welland note that the job of network manager today requires a lot of interaction with top management, a task for which many communications managers do not find themselves prepared.

Held suggests that the manager learn to deal with upper management by not only knowing that something must be done but presenting the situation, the telecommunications need and the alternatives so that management can then make a decision. This formula works, he says, for equipment purchases, staffing and a host of other situations.

"I deal with top management all the time," Welland says. "It's tough for many [network managers], but I think that's changing. Corporations need people who can look at telecommunications as a business. It requires a shift in orientation. I think you just evolve into it."

This shift in thinking may intensify in the future. Held says that communications managers will have to deal more and more with a market that is maturing, requiring those business skills that Welland mentions. Welland predicts the merger of data processing, data communications and other forms of communications into one information organization. Both of these possibilities are sure to make the network manager's role more important over the short and long term. •

European carriers seek traffic

Low costs aid international voice, data communications

BY LEN ELFENBEIN

For corporate users, the last two years have been a watershed period for international telecommunications. The cost of most international services has dropped, particularly between North America and Western Europe, and new services have been introduced that have changed the economics of applications design.

In the early 1980s, voice-grade circuits between the U.S. and Western Europe cost between $9,000 and $13,000 per month, including local circuits on each end. Higher speed 64K bit/sec. circuits were available at a cost of $17,000 to $23,000 per month and more.

Given the limitations that time zone differences placed on the use of such circuits for voice communications, few users could justify such expensive circuits for their voice and data requirements.

More recently, however, European Postal Telephone and Telegraph (PTT) companies and carriers have recognized the importance of providing reliable and economical communications services as a way to attract and hold international businesses in their countries.

While these PTTs and carriers have always competed to some extent for the business of the international user, this competition has intensified significantly. As a result, many have been improving their facilities and revising their country's tariffs to attract as many corporate networks and communications users as possible.

The introduction of Intelsat's business service (IBS) has produced a major drop in the cost of voice and data transmission service between the U.S. and Western Europe. It also provides a transition from the use of traditional voice-grade lines to Integrated Services Digital Network, the wave of the future.

The nature of this transition is to introduce the concept of a corporate network that can handle multiple voice, data, facsimile and other transmissions on a multiplexed wideband facility.

When users have a volume of traffic greater than a basic threshold, they will dramatically decrease the cost per unit of transmission through the use of IBS services.

Increased capacity

For approximately 40% more than the cost of a voice-grade circuit, you can get an IBS 64K bit/sec. circuit in almost every country. And what that extra 40% buys is an increase of more than 500% in the ability to carry data.

The use of 64K bit/sec. circuits also provides a lower cost per unit of voice or data traffic than does the use of multiple voice-grade circuits.

Determining a circuit's ability to handle traffic that would otherwise be serviced by the public voice and data networks is a good way to evaluate its productivity. The circuit's capacity can be compared with its ability to support such traffic during any period of time. In making such a calculation, a company could

Elfenbein is president of Lynx Technologies, Inc., a company that specializes in designing and implementing international voice and data networks.

also determine the break-even traffic level required to justify the circuit.

Of course, the move up to an IBS 64K bit/sec. circuit is only feasible if it can be used effectively.

There are differences in the technical standards for communications equipment in the U.S. and in each European country. Equipment such as terminals, modems and multiplexers were designed to meet local standards in each country. However, there is a sufficient number of vendors selling compatible equipment in each country that users should encounter few, if any, problems in operating desired systems and networks.

A company may not find its favorite U.S. device in Europe, but it will surely find a device that will perform the same functions as well or better. In some countries, such as France and the UK, equipment that is available in the U.S. is also available with modified power supply and signaling to conform to local requirements.

Most users will find that existing PTT regulations and policies will not keep them from developing their European networks. This is particularly true in France, the UK and the Netherlands, where users are given a wide latitude in the use of leased circuits and equipment.

One of the most important differences between U.S. and European networks is that in the U.S., there tends to be a uniformity between circuit cost and distance. In international networks, circuits of similar length can vary greatly in cost.

In the U.S., the cost of circuits between different pairs of cities that are all roughly the same distance apart will not differ by much.

However, the cost of an intercontinental circuit between the U.S. and Western Europe can vary greatly. A single voice-grade circuit can cost as little as $7,000 per month between the U.S. and France and almost $10,000 per month between the U.S. and West Germany. An IBS 64K bit/sec. circuit can cost as little as $8,700 per month between the U.S. and France

and under $15,000 per month between the U.S. and more expensive European countries.

While the currency rate can affect these costs, it accounts for only a small portion of the cost variations in intercontinental circuits. In addition, intra-European and domestic tariffs can vary widely from country to country.

Geography, therefore, is not a sound basis for the cost-conscious design of an international network. Circuits from England or France to other European countries can be less expensive than circuits to the same locations from Belgium, West Germany or Switzerland, regardless of the distances involved.

Because the cost of transatlantic circuits makes it impractical for most users to run a circuit from the U.S. to each European country, most users must carefully select one or two locations in Europe from which to hub their networks to other European countries.

Sticking to the rules

While all PTTs and carriers abide by the vast majority of technical recommendations of regulatory groups, such as the Consultative Committee on International Telephony and Telegraphy and the Conference of European Postal and Telecommunications, there are wide variations in interpreting how those recommendations affect the use of telecommunication facilities and equipment by end users.

It is also important to note that some PTTs and carriers include the cost of national circuits in their tariffs for certain leased circuit services.

The simplest way to use a 64K bit/sec. circuit is to use a statistical multiplexer that can handle a circuit of this speed and treat the circuit as a wideband data circuit. This is adequate if a company's needs are largely for data transmission or if its voice traffic is already digital.

Most users, however, have a mix of analog voice and data traffic between the U.S. and western Europe. Voice requirements peak during afternoon hours in Europe and morning hours in the U.S. Time differences can have a

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TIME differences can have a tremendous effect on the mix of voice and data traffic demand.

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tremendous effect on the mix of voice and data traffic demand.

With the introduction of IBS services, a number of vendors have developed equipment that can multiplex a 64K bit/sec. circuit into up to eight individual 9.6K bit/sec. paths, each of which can be used as a single voice or data channel.

Many different multiplexing and connecting arrangements are also supported. In their most complex configurations, multiple voice and data circuits can be utilized, including a mix of synchronous and asynchronous circuits up to 19.2K bit/sec. The cost for this equipment is approximately $40,000 for both ends and can easily be justified on circuits such as IBS 64K bit/sec.

In the last decade, equipment was developed that could multiplex an M1020 voice-grade circuit into two or four voice channels. M1020 is the CCITT standard for condition voice-grade lines. This was accomplished by encoding each voice transmission at either 2,400 or 4.8K bit/sec. The voice quality of this setup was clearly poor, and although some users found the degradation acceptable, others found the quality too poor to use effectively.

Today, however, improved sampling techniques and the higher bit rate result in voice quality that is almost as good as ordinary analog connections on the public switched telephone network. In fact, many cannot detect a difference.

During the next few years, other countries are likely to introduce IBS-type services, and the economic and service advantages now available between the U.S. and Western Europe will extend to other areas of the world. In addition to fiber-optic-based undersea cables, users can also expect higher quality service at a lower cost per unit of transmission. •

A new look at languages

Using Function Points, MIS can measure the power of its programming languages

BY CAPERS JONES

How powerful are the languages that you use in your shop?

Experts have developed many ways of determining the effectiveness of languages; some are more effective than others. Most methods are rather subjective, comparing languages with other, proven ones or using a trial-and-error manner until the best is found.

The invention of Function Points in 1979 by A. J. Albrecht of IBM has recently given software engineering researchers a new way of evaluating the power of programming languages. The use of Function Points is starting to lead to a standard way of exploring the productivity impacts of languages and other software technologies as well.

Now that Function Points

Jones is chairman of Software Productivity Research, Inc. in Cambridge, Mass.

have been in use for nearly 10 years and thousands of applications have been measured with them, a surprising by-product of the technique has been observed. Empirical observations have discovered that languages have varying but characteristic levels. In this instance, the word "level" is defined as the average number of statements required to implement one Function Point.

This form of research is quite new and is leading to interesting preliminary findings. At best, the Function Point analysis of programming languages may lead to the development of a periodic table of languages similar in concept to chemistry's periodic table of elements. At the least, Function Points will add a new and objective way of considering which languages are appropriate for various kinds of applications.

Either way, the table of language levels presented on page 98 is provisional and subject to change. The ratings are being made available as a research aid;

their current accuracy is not high.

Recently, after several hundred applications had been measured with Function Points, a new phenomenon was observed: Various languages seemed to require characteristic numbers of source code statements to code a given number of Function Points.

For example, Cobol seemed to require about 105 noncommentary source code statements to implement one Function Point. PL/I seemed to require approximately 80 noncommentary statements, while Ada seemed to require about 71 noncommentary statements per Function Point.

Uniform evaluation

As more and more projects written in more and more languages were measured with Function Points, we were able to envision a uniform way of evaluating the languages that would add rigor and objectivity to the current informal
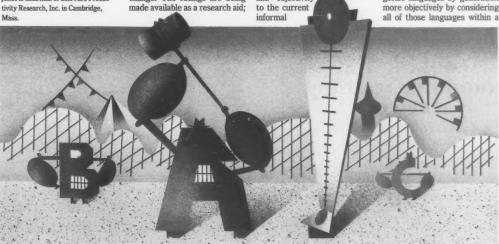
and unsatisfactory definitions of level and generation.

In the past, the level of a language was more or less proportional to the number of machine statements that would be executed as a result of a single-source instruction. But there was never any mathematical rigor associated with this definition.

A new definition of level is now possible, in which it means "the average number of source statements required to implement one Function Point." Note that because commentary statements — although useful — are not required, they would be excluded from this definition.

The term "generation" was even more unsatisfactory and was never precisely defined at all. Four and sometimes five rough groupings of languages by generation were asserted to exist, but no clear rules were ever developed for assigning a language to a generation.

We may now be able to categorize languages by generation more objectively by considering all of those languages within a

TERRY ALLEN

- **A more effective productivity gauge**
- **Prototype for a periodic table of languages**
- **Where does your favorite fall?**

range of levels as constituting a generation.

Other definitions associated with languages have also been viewed as vague and unsatisfactory — like "procedural" vs. "nonprocedural," "strongly typed," "associative" "object oriented" and so on.

These definitions will continue to be useful; here, too, it would seem that a categorization based on the new definition of level would be helpful.

The ratio of source statements to Function Points can be used for a number of purposes, including the following:
• The ability to size a project, or predict the number of source code statements that will be required, as early as the requirements or design phase.
• The ability to retrofit Function Points to existing software without the laborious hand-counting required by the Function Point parameters.

• The ability to convert the size of an application in any language to the equivalent size if the application were written in some other language.
• The ability to measure the productivity of projects that are written in multiple languages.

Because Function Points are usually defined during the requirements and early design phases, the relationship between Function Points and source code makes sizing a much more reliable task than the previous method of ad hoc guessing.

New life for aging software
Many companies have enormous portfolios of aging software, and much of it was written before Function Points were invented. The ratios between Function Points and source code would make it possible to "backfire" a Function Point total for existing applications with very little

What's a Function Point?

Function Points are an abstract metric similar in concept to the Dow Jones industrial average. They are derived from a weighted combination of the number of inputs, outputs, inquiries, logical data files and interfaces associated with a software program.

To measure a program, the developer counts those items and multiplies the total by weighting factors that adjust for complexity. The Adjusted Function Point total then becomes the economic unit of measurement for that application.

The Function Point metric is independent of the language or languages used to implement the software, therefore it is free of some of the mathematical paradoxes associated with counting

lines of source code as a productivity gauge.

For example, the lines-of-source-code metric sometimes behaves in strange ways, such as moving in the opposite direction of real economic productivity. And in fourth-generation languages, query languages and nonprocedural applications such as spreadsheets, there may not be any lines of code to count.

Function Points were developed to overcome the serious mathematical problems associated with the older source code metrics. The number of Function Points for an application stays constant, regardless of what language or combination of languages is used for coding.

— CAPERS JONES

Selected languages and their Function-Point levels*
Level 1 represents a low-power language category; Level 75, a high-power category

Language	Level	Source statements per Function Point
Low-level default	1	320
Machine language	1	320
First-generation default	1	320
Basic assembly	1	320
Macro assembly	1.5	213
C default	2.5	128
Interpreted Basic	2.5	128
Fortran II	2.5	128
Fortran 66	2.5	128
Second-generation default	3	105
Procedural language default	3	105
Fortran 77	3	105
Algol 68	3	105
Algol W	3	105
Chill	3	105
ANSI Cobol 74	3	105
MUMPS	3	105
Jovial	3	105
Strongly typed default	3.5	91
ANSI Cobol 85	3.5	91
Pascal default	3.5	91
Compiled Basic	3.5	91
PL/S	3.5	91
High-level default	4	80
Third-generation default	4	80
Report generator default	4	80
PL/I	4	80
Modula 2	4	80
Problem-oriented default	4.5	71
Ada	4.5	71
Weakly typed default	5	64
Prolog default	5	64
LISP default	5	64
Forth default	5	64
ANSI Basic	5	64
English-based default	6	53
Natural	6	53
AI shell default	6.5	49
Simulation default	7	46
Decision table default	7	46
Database default	8	40
Nonprocedural default	9	35
Decision support	9	35
Statistical default	10	32
APL	10	32
Object-oriented default	12	29
Objective C	12	29
C++	12	29
Smalltalk	15	21
Fourth-generation default	16	20
Program generator default	20	16
Query language default	25	13
SQL	27	11
Spreadsheet default	50	6
Fifth-generation default	75	4

* This table is provisional and subject to change; the ratings are being made available as a research aid only

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effort. It would only be necessary to know the source code count and the languages used.

The numeric levels of various languages provide a convenient shortcut for converting size from one language to another. For example, if an application required 1,000 noncommentary Cobol statements (Level 3 in the table), then it would take only 500 statements in a Level 6 language such as Natural or 250 statements in a Level 12 language such as Objective C. As you can see, the average number of statements required is proportional to the levels of the various languages.

Almost one-third of U.S. software is written in combinations of languages. Some large distributed systems projects may utilize as many as a dozen different languages. In this case, the Function Point technique provides a convenient way of both measuring productivity and evaluating the relative contributions of each language.

No simple corollary

It is often assumed that there is a direct correlation between the level of a language and development productivity. There is a relationship between the two, of course, but it is not a simple, linear one. For most large software projects, coding amounts to less than 30% of the total effort, while paperwork and defect removal costs absorb the other two-thirds.

Assuming that a given program is written in a language that is twice the level of a similar program — say, Level 6 vs. Level 3 — the coding effort might be reduced by 50%, but the total project might be improved by only 15% because coding only accounted for 30% of the original effort.

Doubling the level of the language again, say up to Level 12, will only provide an additional 7.5% net savings. Once again, the coding is halved, but coding is not a major factor for many of today's large systems.

Accurate economic productivity rates can be gained by examining the average monthly Function Point production rates associated with various language levels, as follows:

• Language Levels 1 through 3 usually average net productivity rates below five Function Points per staff month.

• Language Levels 4 through 8 usually average from five to 10 Function Points per staff month.

• Language Levels 9 through 15 usually average from 10 to 20 Function Points per staff month.

• Language Levels 16 through 23 usually average from 15 to 30 Function Points per staff month.

• Language Levels from 24 to 55 usually average from 30 to 50 Function Points per staff month.

• Language Levels above 55 usually average from 40 to 100 Function Points per staff month.

Researchers have been studying the relationship between source code statements and Function Points for only a few years, so the margin of error is currently quite high. Even so, the method is useful enough so that publication of the preliminary table — including its notable gaps and errors — may still be helpful. Further research will fill in the gaps and correct the errors.

The range of uncertainty with the Function Point level concept is still being explored, and here, too, research is lead-

> **F**OR MOST large software projects, coding amounts to less than 30% of the total effort, while paperwork and defect removal costs absorb the other two-thirds.

ing to interesting observations.

For some languages, such as PL/I, researchers have observed only about a 10% spread in source statements per Function Point. For other languages, such as Cobol, the spread is about plus or minus 50%. Why some languages should be so variable and others so constant is an intriguing problem for future research.

Today, there appear to be more than 500 languages and major dialects of languages available to software practitioners. The current table contains only 55 languages and major dialects. Some of the languages in the table may have had their levels incorrectly derived, and of course many languages are not included in the table at all.

A complete and reliable industrywide study of languages and their levels is of necessity a large, multiyear project. A reasonable sampling of applications and languages would require data from about 50,000 projects, assuming 10 projects in each of 500 languages or major dialects.

However, the organizing principle used here is basically sound, and the construction of a periodic table of languages is potentially as useful to software engineering as the periodic table of elements has been to chemical engineering and to physics.

Cautions

The numeric level of a language may improve software development productivity, but there is not yet enough empirical evidence to demonstrate that maintenance will also benefit.

There is some empirical evidence, however, that execution speeds or performance may be inversely related to level. For example, languages above Level 5 may not be appropriate for high-performance, real-time applications such as

radar tracking or aircraft collision avoidance.

Therefore, other factors besides Function Points must be considered when choosing a language for any given application.

Levels 1 through 5 contain more than 150 languages and dialects by actual count, and the bulk of the world's software — possibly as much as 85% — to date has been written in these languages. Assembler languages, all versions of Cobol, all versions of Fortran, interpreted and compiled Basic, LISP, Pascal, PL/I and Ada all tend to average between 55 and 325 source statements per Function Point. As a set, Levels 1 through 5 can be considered to be the overall domain of general-purpose languages.

Levels 6 through 10 contain about 85 discrete languages and dialects and tend to average between 30 and 55 source statements per Function Point.

The languages in this set are often specialized for particular purposes such as statistical analysis, simulation, database construction, decision support and artificial intelligence shells.

This specialization allows the languages to be effective and powerful, but it also reduces the overall range of applications in which such languages can be used. Examples of languages in this second set include APL, Pilot, Intellect, Natural, Simscript, Style and Stratagem.

Object-oriented languages
Levels 11 through 15 currently contain about a dozen languages and dialects. These languages tend to average from 20 to 30 source statements per Function Point.

This set is the home for the majority of the object-oriented languages including C++, Objective C, Actor and Smalltalk. The object-oriented concept of inheritance greatly facilitates reusability and allows complex applications to be developed from a relatively compact set of primitive constructs.

The object-oriented set in Levels 11 through 15 also seems to be effective in terms of high-performance applications, such as real-time software. These languages may represent a new approach to software engineering that couples both linguistic power and high execution performance.

Levels 16 through 20 tend to average from 15 to 20 source statements per Function Point. This set includes program and application generators and includes perhaps 35 to 50 "languages" — in this case, "language" includes generator-input statements. Examples of languages in this set include Ideal, Linc, Telon, Gama, Pacbase, Magec, Express and Transform. These languages are often effective for information systems and transaction-oriented database projects.

Levels 21 through 25 tend to average

from 12 to 15 statements per Function Point. This class includes about 20 different languages, most of which are specialized in the area of database queries. Languages in this set include SQL, QBE, Culprit, Q&A, Sequel and Easytrieve.

Levels 25 and above include spreadsheets and specialized graphics or icon-based languages. Perhaps 50 spreadsheets and a dozen or more specialized graphics or icon-based languages are found in this set.
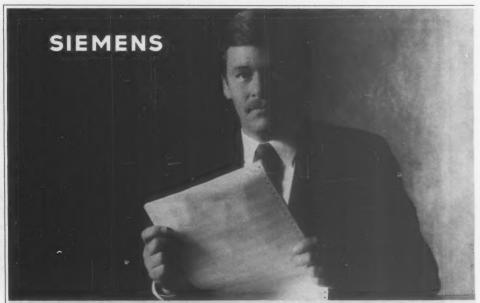
Spreadsheets typically average four to six formulas or expressions per Function Point, while icon-based languages sometimes require only three to four symbols per Function Point.

The study of the relationship between

THE STUDY OF the relationship between Function Points and source statements in various languages is one of the newest fields in software engineering. The research in this field to date is less than five years old. The preliminary results, however, are intriguing.

Function Points and source statements in various languages is one of the newest fields in software engineering. The research in this field to date is less than five years old.

The preliminary results, however, are intriguing. The industry has long needed a way of evaluating languages that would be both objective and effective; Function Points may be able to meet both requirements.

As a new discipline, today's use of Function Points is likely to be modified quickly in the light of future research. But the expansion factor of Function Points to source statements is leading to a new avenue of research and will perhaps result in a new understanding of languages themselves. •

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Software design: It's all in your mind

Cognitive theorists say design is more about programmers than programs

BY ROBERT L. GLASS

What is software design? That may seem like an odd question. After all, people have been designing software for more than 30 years now. And don't we have all the methodologies and languages common sense says we need? So why — now — ask, "What is software design?"

The fact is that while MIS has talked a lot about design, we have only been playing around on the periphery of the subject.

Methodologies are not design, they are frameworks for organizing design efforts. Languages are not design, they are representations for writing down the design once we get it. Design is something that happens inside the head, in the brain, and it happens at a speed faster than lightning — although some people's lightning strikes more quickly than others'.

Lately, many software design experts have admitted that they have never really understood what design was and have always, in fact, wondered whether they were taking the right approach to the process. Because of design's elusive nature, some of these experts have started conducting research into what it really is. And they are beginning to come up with some answers.

To understand these researchers' ideas, you may have to loosen your grip on a few notions that have become tradition in the short history of software. Quit thinking of external repre-

Glass is president of Computing Trends, a software engineering education and consulting company based in Pittsburgh.

ANNIE GUSMAN

sentations as what design is all about, and focus on the mental process. For it is inside the mind that the secret of design lies.

Empirical findings

Software researchers such as Bill Curtis at the Microelectronics and Computing Consortium in Austin, Texas, and Elliot Soloway — currently at the University of Michigan in Ann Arbor and formerly at Yale University — have long been interested in the idea that the study of software is at least as much about studying programmers as it is about studying programs. They call this ongoing field of research "empirical studies of programmers," and their latest focus has been on design.

These researchers laid out a plan for answering the question, "What is design?" They decided they had to capture the thought

processes of designers doing their work without intruding on, and therefore disturbing, the process. And that is easier said than done. But with the methods of a generic discipline called "protocol analysis," they have managed to do it.

They have sat quietly with designers at work and prodded them to think aloud, recording what they say. They have audiotaped design sessions. They have videotaped group design processes. They have pored over the results of the recording process. And they have begun to formulate a theoretical description of what those designers do.

What they first learned was not all that illuminating. They found that design involved the following processes: understanding the problem, decomposing the problem into goals and objects, selecting and com-

posing plans to solve the problem, implementing the plans and reflecting on the product and the process.

None of that was very helpful, however. Indeed, with a little tweaking of the words, this sequence of events is not much different from what we call the software life cycle, a thing we have known about and wrestled with for years.

But once the researchers delved more deeply into the specific process of selecting and composing plans, they struck pay dirt. Lurking inside that category was a simple set of steps that were the essence of design.

The essence of design

The researchers found that software designers, mentally and at lightning speed, were doing the following things:

- Constructing a mental model of a proposed solution to the problem.
- Mentally executing the model — in essence, running a simulation on it — to see if it solved the problem.
- Finding that it did not solve the problem, usually because the model was too simple; playing back the inadequate model to compare it with those parts of the problem to see where it failed; and then enhancing the model in those areas.
- Repeating the three steps until they had a model that appeared to solve the problem.

What the researchers ultimately did was describe a mental process — a very rapid, iterative process — of fast trial and error. The mind forms a solution to the problem, all the while knowing that it will be inadequate because the mind is not yet able to fully grasp all the facets of the problem.

That problem solution, the

- **Bill Gates and Gary Kildall do it**

- **Rapid mental modeling and simulation**

- **Failure is just a part of the process**

mind knows, must be in the form of a model, because it is going to be necessary to try sample input against the model, run a quick simulation — inside the mind — on the model using that sample input, and get sample outputs — still inside the mind — from that simulation.

The essence of design, then, is rapid mental modeling and simulation. A key factor in design is the ability to propose solutions and allow them to fail.

Indeed, these researchers also explored the problems of people who are not very good at design. Those individuals tend to build representations of a design rather than models; they are

> "The first step in programming is imagining. Just making it crystal clear in my mind what is going to happen. In this initial stage, I use pencil and paper."
>
> CHARLES SIMONYI
> MULTIPLAN CREATOR

then unable to perform simulation runs, and the result is that they invent and are stuck with inadequate design solutions. Their designs do not fail often enough in the early stages and therefore may fail completely in the end.

Thus, it becomes clear that devising a model that fails — and analyzing the causes for that failure — is an essential part of successful design.

Each of the previously described mental steps could produce a failed model, one shown to be inadequate to solve the problem. Those failures could lead to more successful models, suggesting that an integral part of success is the ability to fail and to recover from it. That notion has some intriguing implications from the point of view of teaching design — or any other subject for that matter. Where do we teach failure and how to recover from it?

What the pros say

Several famous software designers have articulated some of these same ideas about design. In *Programmers at Work*, culled from interviews conducted by Susan Lammers, the following luminaries commented on the design process as they saw it:

• "The first step in programming is imagining. Just making it crystal clear in my mind what is going to happen. In this initial stage, I use pencil and paper. I just doodle . . . because the real picture is in my mind." — *Charles Simonyi, creator of Microsoft Corp. Multiplan.*

• "At some point, the [design] gets explosive, and I have everything inside my brain at one time . . . All sorts of things go on in my brain that I can't put on paper because I'm always changing them." — *Gary Kildall, creator of Digital Research, Inc. CP/M.*

• "You have to simulate in your mind how the program's going to work. . . . When you're creating something, . . . and you have that model in your mind, it's a lonely thing." — *Bill Gates, chief executive of Microsoft.*

Another crucial finding about design that comes from research — such as Willemien Visser's work in 1987 at the National Institute for Information and Automation Research in Le Chesnay, France — is that designers rarely start from scratch. That is, they typically use an existing

model from a prior solution to a similar problem as that first cut at the model that begins the simulation process.

Team efforts

So far, we have only been considering individuals doing design. But design in the 1980s has evolved into more of a team process.

Problems have gotten too big for individual designers, and interdisciplinary problems have created a need for multiple and diverse skills among designers.

Empirical-studies researchers have been examining teams, too. In many ways, they have found, team design is a shared form of individual design, incorporating the following processes:

● The teams create a shared mental model.

● Team members, sometimes in their own minds and sometimes in the group, run simulations against the shared model.

● The teams evaluate the simulations and prepare the next level of the model.

But in other ways, these efforts are unlike individual design:

● Conflict is an inevitable part of the design process; it must be managed rather than avoided.

● Communications techniques become a vital part of the design process.

● Issues sometimes fall through the cracks because no individual claims responsibility for them.

Today's teams of designers are typically composed of three to six people. And sometimes, for enormously complex tasks, even that is not enough. Then, design becomes an organizational problem.

Typical organizational design evolves into a hierarchy of design teams, each with its own assigned problem subdomain, with an additional special team of chief architects whose job it is to hold the whole design effort together.

But design in team and organizational settings creates its own problems. Design can easily evolve into committee work, with all the negatives that that implies — remember that the "camel is a race horse designed by a committee."

Fred Brooks, author of *The Mythical Man-Month*, has

> " A t some point, the [design] gets explosive . . . All sorts of things go on in my brain that I can't put on paper because I'm always changing them."
>
> GARY KILDALL
> CP/M CREATOR

pointed out that the best products, the ones that most people agree have conceptual integrity — like Pascal and Unix — were designed by individuals. And while there are successful team designs, like Ada and Cobol and the IBM mainframe operating systems, they are generally looked down on as being successful but clumsy, Brooks points out.

What next?

Still we have some new understandings about design. Clearly, there is a well-defined process that goes on inside the mind during design.

It begins with an existing or simplified model, runs a simulation on that model and continues iteratively until the design solution meshes with the problem to

be solved. If the problem is big enough or complex enough, then teams or even organizations can do design. They use many of the same techniques that individuals employ but they also use group process, a clumsy but sometimes necessary way to do business.

Now that we have gained insight, we have to decide what to do with that knowledge.

There are three categories

through which to deal with cognitive software design: the implications on the teaching of design, the implications on the doing of design and the implications on the managing of design.

In teaching design, it will no longer be enough to teach one, two or three methodologies and representations.

Those older topics must be taught within a framework that

includes the idea of design as a mental process.

In doing design, it will be helpful for the designer to understand that the heart of design is not what he thought it was supposed to be.

The true method

The clumsy, iterative process of trial and error that the designer is probably pursuing is actually

the way it is supposed to be. That understanding may give designers the confidence to pursue these design approaches without guilt.

In managing design, managers should focus on communications facilitation and conflict resolution as their contribution to the design.

The empirical studies researchers further suggest the

management of design should be the management of the key issues that arise during the design process. In pursuit of these goals of better design education, practice and management, several tool concepts have been proposed by the researchers.

We do not know how to build all of these tools yet, but as they become widespread, they will go a long way toward assisting in the cognitive design process. These tool ideas include the following:

● Modeling and simulation packages designed to support the

> "You have to simulate in your mind how the program's going to work.... When you're creating, ... it's a lonely thing."
>
> BILL GATES
> MICROSOFT

mental process.
● Idea archive and retrieval packages to prevent thoughts from falling through the cracks.
● Strategic assumption surfacers that keep track of key requirements and pop them up when a potential design is about to violate one.
● Issue-based conflict resolution support.
● Unresolved issue recording and tracking.
● Mediated discussion support.
● Group idea collection and coordination.
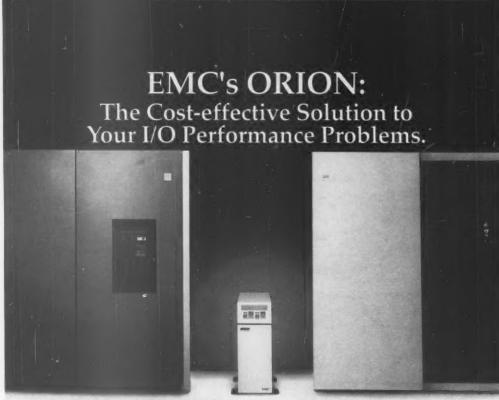
It may be premature, however, to talk about tools to support the cognitive process of design. We are just beginning to understand what design is really about after thinking we knew what it was about for the last 30 years. Perhaps just that should be enough to absorb us for a while. Figuring out what to do with that knowledge may be an issue for a later time. ●

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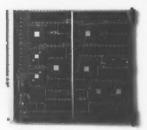
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We feel an obligation to support those users. And believe the best way to support them is a unified UNIX standard.

Make no mistake. In the long run, the level playing field created by a single standard will be as good for Unisys as it is for customers. We plan to compete aggressively, and think that, in an open environment, the breadth and quality of our products and services will stand out even more.

But the first step to healthy competition is healthy cooperation—industry-wide.

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The power of ^{2}

MANAGEMENT

James Connolly

Linking up profits and planning

"Horse" and "carriage," "love" and "marriage," "profits" and "planning."
Each word goes so well with its counterpart, right? Honest, they do go together, even if the romantics of the world are offended by any hint of money in a sentence that mentions love.

The link between profits and good planning may be more crucial than ever in the information systems business, and the evidence came through in the comments of successful IS executives who spoke at the recent Institute for International Research conference in New York on "Profiting from Strategic Information Management."

It is true that various speakers slipped into technology mode, detailing how optical disks or new processors help their companies. Others moved into talent mode — boasting about the skills of their subordinates. But there remained a common recurring theme, and that related to the value of planning, particularly in tying IS plans to the corporation's plans and goals.

The speakers included some of the best-known U.S. information directors, such as John Hammitt of United Technology Corp., Darwin John of Scott Paper Co. and Irwin Sitkin of Aetna Life & Casualty Co.

The discussion repeatedly returned to topics such as the importance of a strategic information plan and the need to focus research and development on technologies that are critical to the success of the company. Adding another 20 million instructions per second (MIPS) of computing power or blindly hiring 100 programmers just doesn't make it these days.

IS executives must establish and nurture relationships with their clients, who include the end users in the corporation, the executives who run the company and the outside customers — and, again, the speakers hit the

The MIS message: How to get it across

BY ALAN J. RYAN
CW STAFF

The job of spreading information within a company varies in direct proportion to the type of information to be disseminated. For instance, office gossip can spread a rumor within minutes. But when the MIS department wants to get its message across to users, it is not that simple.

Each MIS department deals with the information-dispensing dilemma in its own way. According to MIS directors polled recently, some of the most widely used methods being employed today include the following:
• Printed information in the form of newsletters, bulletins or magazine-type publications.
• Workshops, educational classes and seminars to discuss new technologies or new methods of using the systems.
• Electronic mail and bulletin boards for quick messages alerting users to systems information, events within the computing community and related materials.
• Phone support lines for users with questions or problems.
• Non-MIS employees designated as departmental resident experts who can help to field individual or departmental computer problems or questions before users turn to the MIS office.
• In-house users groups, in which users can voice concerns and share insights.
• Systems manuals and user manuals.

All of the companies surveyed said they rely on more than one method to dispense information, but all methods meet with varying degrees of success.

The most common problem MIS faces in trying to spread its word is that most user communities are composed of two separate groups: those who are technically inclined and those who are not. Since most companies do not have separate methods for dealing with both communities, the most effective ways to talk to users are through publications aimed at general audiences, via E-mail or through support phone lines.

"It's a large audience to address with one solution. So, we let our users dictate which level of support they are going to tap into," said Joe Vincent, director of technology planning at Humana, Inc. in Louisville, Ky. If the newsletter is inadequate, the user is invited to call a special help line for additional information.
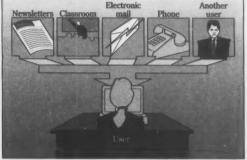
At Metropolitan Life Insurance Co. headquarters in New York, the magazine *Perspectives on Technology, a Journal for Senior Management* is published approximately three times a

Distributed user information
MIS employs a range of methods for disseminating its information to individuals companywide

Newsletters Classroom Electronic mail Phone Another user

User

CW CHART

Inside
• Technical analysts taking the cake. Page 118.
• How do you deal with your own turnover? Page 122.
• More pathways within Monsanto. Page 123.

Trump Plaza pulls royal flush on information boardwalk

BY ALAN J. RYAN
CW STAFF

The name of the game in the cavernous, mirrored casino is staying ahead by drawing the best cards. In the cramped computer room and generic MIS offices off the back corridors at Atlantic City's Trump Plaza Casino and Hotel, the same theories apply.

In the New Jersey city by the sea, where tourists and gamblers' dollars flow like the tides, Trump's 35-member MIS department has nearly $3 million to spend annually on its hardware, software and staffing needs. It has young but experienced players deciding which technologies to bet on.

MIS Director Karl J. Swanseen, 34, is responsible for keeping Trump Plaza ahead of the competition by making the Plaza's customers happy and keeping the company's computer users content.

Happy customers — who may be gamblers who have credit lines ranging from $500 to $1 million approved within minutes, or those who have trouble-free check-in and check-out — are more likely to spend their gaming money where they get the best service. Swanseen's mandate is to keep customers happy by giving Trump Plaza computer users the hardware and software they need to get their jobs done. That task is becoming more complex as the Plaza's international database of rated gamblers, now numbering approximately 500,000 names, continues to grow.

Growth is the name of the game, and it is happening in Atlantic City and in the casinos that line its shores. The once-opulent seaside resort noted for its expansive boardwalk had degenerated into a shabby has-been by the 1970s. Now, the big casinos are revitalizing the area that was the inspiration for Parker Brothers' Monopoly game.

Those casinos, which include the Trump Castle and the under-construction Taj Mahal, which may become another Trump holding, bring MIS jobs and opportunity with them. Still, Atlantic City does not yet have the allure of big cities for MIS jobs, and it is a problem Swanseen is constantly battling.

PROFILE
Karl J. Swanseen, Matthew Meldon

Position: *Swanseen — MIS director; Meldon — Microcomputer manager, Trump Plaza Casino and Hotel.*
Mission: *To offer state-of-the-art technology to in-house users so that they, in turn, can offer high-quality service to the gamblers and guests at Trump Plaza.*

On the other hand, the relatively low competition for data processing jobs in Atlantic City gave rise for the energetic Swanseen to advance from being a computer operator at a local hospital 11 years ago to his current position.

The same situation afforded college dropout, former parking-lot attendant and self-taught personal-computer guru Matthew Meldon the opportunity to climb the ranks in casinos throughout the city to become microcomputer manager at Trump Plaza at age 27.

For Swanseen, one way to retain employees such as Meldon is by giving the talented workers what they want: "Staying state-of-the-art is one way to draw the best talent and keep the talent that you have."

Trump's equipment will soon include three IBM Application System/400 Model 60s that will

HOW TO FIND A PART
YOU GET THROUGH T

Study finds DP operations salaries up 6.6%

BY ALAN J. RYAN
CW STAFF

ORANGE, Calif. — Data entry centers — and those who run them — are becoming things of the past at many corporations, while new, more lucrative positions are opening up for technical analysts.

Those are the findings of the 1988/1989 survey of data processing operations salaries of the International Association for Computer Operations Management (AFCOM). AFCOM also determined that within the 400 large and medium-size companies polled, overall salary increases in DP operations averaged 6.6%. Those percentages are much higher than the 3.9% increases for 1988 projected by last year's respondents to the survey and include the DP operations, computer operations, data control and data entry areas.

"There is less manual work being done in the computer room now," said Leonard Eckhaus, president of AFCOM. "With automation, we expect to see a lot less of the traditional operations staff" and more technically oriented analyst positions in the years to come.

The highest paid professional in DP operations is the DP operations manager, who earns an average of $48,900 annually, the survey found.

Eckhaus said larger shops tend to pay more than smaller operations, and the highest salaries for most of the positions surveyed are typically found in the Northeast, followed by the West, the Midwest and the South.

For the operations manager, for instance, the average pay figure swells to as high as $54,800 in the Northeast and drops as low as an average of $43,400 in the South.

The DP operations manager, according to the survey terminology, is responsible for all activities in the computer operation, data control and data entry sections. Operations managers prepare the annual budget, set policy and review the performance of all section supervisors or managers, set goals, do future planning and have overall responsibility for all operational areas.

Following the manager on the pay scale are DP operations analysts, whose average annual pay is just over $33,400, according to the survey.

AFCOM describes the position as the highest level general-operations technical position, with the analyst's job including troubleshooting in all operations areas, developing and preparing statistical reports on systems and throughput and performing physical planning for the computer room.

In regional pay averages, the same operations analyst would earn $34,300 in the West, $31,800 in the Midwest; $34,500 in the Northeast; and $29,500 in the South, according to the survey results.

Maintenance programmers, or those who work with existing production systems and develop code to correct or modify existing production systems, closely follow the operations analysts on the pay scale with an average annual income of slightly more than $33,000, according to the AFCOM report. The maintenance programmer position saw the largest salary gain by position, climbing an average of 11.8% over last year's survey, Eckhaus said.

Doing well in telcom

The telecommunications analyst, who performs troubleshooting on all network problems, will earn an average of approximately $31,000.

The scheduler, who prepares the schedule of work for the computer room and data entry and monitors throughput, typically earns the lowest pay in the DP operations area, with an average salary of just more than $27,000, according to the report.

The largest salary gains by department were typically in data entry, which jumped 8% over last year's results, Eckhaus said.

Positions in that department range from the data entry operator, earning an average of $16,700 on the low end of the pay scale, to data entry manager on the high end, earning $28,800. However, he cautioned, many companies are eliminating their data entry departments.

"This year, only 44% of those surveyed reported having a data entry department at all. Based on what we're seeing, the formal data entry department as such is something that is going to totally disappear rapidly," Eckhaus said. In 1984, the AFCOM survey found that 95% of those surveyed had formal data entry departments.

In the computer operations area, an operator trainee earns an average of $16,500, and an operations manager earns approximately $38,000, according to the national average found in the survey.

According to the report, the most difficult positions to fill are, in this order, computer operator, operations analyst and senior computer operator.

Of those responding to the survey, 16% had budgets of less than $1 million; almost 41% had budgets ranging from $1 million to $3 million; and nearly 19% had budgets of $3 million to $5 million. The remaining 24% had budgets ranging from $5 million to more than $10 million.

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C A L E N D A R

SHARE 71.5 Interim Seminar. Fort Worth, Texas, Nov. 13-16 — Contact: Share, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Computer Security Conference. Miami Beach, Nov. 14-16 — Contact: Computer Security Institute, 360 Church St., Northboro, Mass. 01532.

Comdex/Fall. Las Vegas, Nov. 14-18 — Contact: The Interface Group, 300 First Ave., Needham, Mass. 02194.

Design for Manufacturability Conference. Orlando, Fla., Nov. 13-15 — Contact: CAD/CIM Alert, Reservoir Executive Park, 824 Boylston St., Chestnut Hill, Mass. 02167.

International Conference of the IRMX Operating System Users Group. Schaumburg, Ill., Nov. 13-15 —

Contact: Intel, 5200 N.E. Elam Young Pkwy., Hillsboro, Ore. 97124.

Strategies for Implementing Distributed Processing. Washington, D.C., Nov. 14-16 — Contact: International Data Corp., Suite 1180, 8000 Towers Crescent Drive, Vienna, Va. 22180.

Canadian Computer Show. Toronto, Nov. 14-17 — Contact: Robert Grainger, Industrial Trade and Consumer Shows, 20 Butterick Road, Toronto, Ontario M8W 3Z8.

Alphametrics Users Conference. Philadelphia, Nov. 15-16 — Contact: Alphametrics, 11 E. Princeton Road, Bala Cynwyd, Pa. 19004.

Talking Yellow Pages and Advertiser-Supported Voice Services. Princeton, N.J., Nov. 15-17 — Contact: Talking Yellow Pages Conference, P.O. Box 145, Point Pleasant, Pa. 18950.

Wescon. Anaheim, Calif., Nov. 15-17 — Contact: Wescon, 8110 Airport Blvd., Los Angeles, Calif. 90045.

Improving Software Quality and Productivity: Trends and Techniques. Cambridge, Mass., Nov. 16-17 — Contact: Software Productivity Research, P.O. Box 1033, 1972 Massachusetts Ave., Cambridge, Mass. 02140.

Inside the AS/400. Los Angeles, Nov. 16-17 — Contact: DGC, 553 Willow Ave., Cedarhurst, N.Y. 11516.

Real-Time Programming Convention. Anaheim, Calif., Nov. 18-19 — Contact: Interest Group, No. D, 1330 S. Bascom Ave., San Jose, Calif. 95128.

MECC '88 Educational Computing Conference. Minneapolis, Nov. 18-22 — Contact: MECC, 3490 Lexington Ave. N., St. Paul, Minn. 55126.

Computer Professionals for Social Responsibility Annual Meeting. Palo Alto, Calif., Nov. 19-20 — Contact: CPSR, P.O. Box 717, Palo Alto, Calif. 94301.

Competitive Manufacturing: Today's American Success Stories. Cambridge, Mass., Nov. 21-22 — Contact: Advanced Manufacturing Research, 65 Federal St., Salem, Mass. 01970.

Domestic and International Technology Transfers Conference. Boston, Nov. 21-22 — Contact: American Conference Institute, Suite 1905, 67 Wall St., New York, N.Y. 10005.

American Society of Mechanical Engineers' Winter Annual Meeting. Chicago, Nov. 27-Dec. 2 — Contact: ASME Meetings Department, 345 E. 47th St., New York, N.Y. 10017.

Unicom '88 Expo and Conference. Dallas, Nov. 28-30 — Contact: Josy Schlosser, North American Telecommunications Association, 2000 M St. N.W., Washington, D.C. 20036.

IEEE Global Telecommunications Conference & Exhibition. Hollywood, Fla., Nov. 28-Dec. 1 — Contact: Globecom '88, 445 Hoes Lane, Piscataway, N.J. 08854.

Engineering Workstations Conference. Los Angeles, Nov. 29 — Contact: Engineering Workstations Conference, P.O. Box 3727, Santa Monica, Calif. 90403.

Implementation Strategies for Expert Systems. Chicago, Nov. 29-30 — Contact: Decision Support Technology, Conference Registration Office, 51 Church St., Boston, Mass. 02116.

Technology Management Forum on Client/Server Computing. Boston, Nov. 29-30 — Contact: Forrester Research, P.O. Box 1091, Cambridge, Mass. 02238.

Artificial Intelligence Expo-East. New York, Nov. 29-Dec. 1. — Contact: Carolyn S. Jackson, Tower Conference Management Co., Suite 408, Building E, 800 Roosevelt Road, Glen Ellyn, Ill. 60137.

OSI Product Integration Conference. McLean, Va., Nov. 29-Dec. 2 — Contact: Corporation for Open Systems, Suite 400, 1750 Old Meadow Road, McLean, Va. 22102.

GIS/LIS '88 Conference. San Antonio, Nov. 30-Dec. 2 — Contact: Urban & Regional Information Systems Association, 319 C St. S.E., Washington, D.C. 20003.

Small Business/Home Office Market Conference. Key Biscayne, Fla., Nov. 30-Dec. 2 — Contact: CAP International, One Longwater Circle, Norwell, Mass. 02061.

National EDI Systems Conference and Exhibit. Washington, D.C., Dec. 13-14 — Contact: J. L. Dreyer, TDCC, 1101 17th St. N.W., Washington, D.C. 20036.

The New Tools — Computer Graphics For Design/Fall 88. New York, Dec. 4-7 — Contact: Pratt Center for Computer Graphics in Design, 45 Stephenson Terr., Briarcliff Manor, N.Y. 10510.

Strategic Issues in Managing Information Technology. Cambridge, Mass., Dec. 5-7 — Contact: Decision Support Technology, Conference Registration Office, 51 Church St., Boston, Mass. 02116.

MFOC '88-West: Military Fiber Optics Conference. Los Angeles, Dec. 5-8 — Contact: Information Gatekeepers, 214 Harvard Ave., Boston, Mass. 02134.

Fiber in the Subscriber Loop. Burlingame, Calif., Dec. 6-7 — Contact: Lightwave, 235 Bear Hill Road, Waltham, Mass. 02154.

In-House Document Preparation, Processing and Printing Conference. New York, Dec. 6-7 — Contact: Expocon Management Associates, 3695 Post Road, Southport, Conn. 06490.

ISDN Comforum. Orlando, Fla., Dec. 6-7 — Contact: Comforum, Suite 740, 303 E. Wacker Drive, Chicago, Ill. 60601.

AEC Expo. New York, Dec. 6-8 — Contact: Expoconsul International, 3 Independence Way, Princeton, N.J. 08540.

Infomatics 88. Hong Kong, Dec. 6-8 — Contact: International Information Management Congress, 345 Woodcliff Drive, Fairport, N.Y. 14450.

Preparing For ISDN: Business Implications Of A Technical Revolution. Toronto, Dec. 8-9 — Contact: Angus Telemanagement Group, Suite 3, Office Mall Two, 1400 Bayly St., Pickering, Ont. L1W 3R2.

Job networking the right way

WESTWOOD, Mass. — Dealing with turnover can be a challenge for any manager who has to find new bodies to fill vacancies. But an outplacement firm located here offers managers advice on how to deal with turnover when it is the managers themselves who are turned over.

James H. Lane, president of the outplacement division at the Costello, Erdlen & Co. human resources management consulting firm, points to networking as a vehicle in which 80% of all new jobs are found.

"Fall is a smart time to launch a networking campaign because it's the beginning of many business and social calendars," Lane said. But Lane also cites pitfalls in how people approach networking in the job market — which some might consider the original peer-to-peer networking.

He listed dos and don'ts to follow:

Dos

● Develop a plan. Networking is a marketing process that should include defining an objective, targeting prospects, making contacts and following up each meeting.
● Be patient yet persistent. Lane's tactical tips include befriending secretaries, placing telephone calls to busy executives during early morning or evening hours

and opening a call or correspondence with the name of a mutual acquaintance.
● Don't always count on others to do follow-up work, such as passing along a resume, and strive for personal contact with the potential employer.
● Be open-minded. Network contacts must extend beyond decision makers. Potential sources for contact with new employers might include clergymen, mailmen, gas station attendants and school coaches.

Don'ts

● Don't ever ask for a job. A networking meeting is a request for contacts, leads or professional advice. However, approach such a meeting as if it were a job interview by dressing appropriately, discreetly

bringing a resume and researching the firm.
● Don't refer to competitors. The executive with whom you are networking does not want to hear that you already met with his competitor.
● Don't surprise anyone. A professional approach is to write a brief introductory letter using the name of a contact or referral, make a follow-up phone call and write a thank-you note later.
● Don't turn down invitations. Valuable contacts can be made at cocktail parties, political fund-raisers, parent-teacher functions and alumni activities.
● Don't forget to reciprocate. When you are comfortable in a new job, remember to be generous with your time and counsel when a networker calls you.

Focus finds disaster backup catching on

Maybe somebody has been listening to all the warnings about the need for disaster backup and recovery plans.

The evidence is offered through a recent study released by **Focus Research Systems, Inc.**, which found that 91.5% of all IBM and IBM plug-compatible mainframe sites have some type of disaster recovery system. According to Focus, the percentage of sites without such a system or plan has dropped from 40% in 1986, to 14.5% in 1987 and 8.5% in 1988.

Of the sites with emergency plans and systems in place, 12.6% use a commercial service, with sites running large hosts such as IBM 3080 and 3090-class machines most likely to use such a commercial service.

In a separate report, Focus noted that more sites than ever are using uninterruptible power supplies (UPS). Focus said that more than 25% of the large-scale computer sites surveyed have a UPS and that 6.2% plan to purchase one. Two years ago, only 17.6% of the sites ran a UPS.

The **Data Processing Management Association** (DPMA) recently joined the affiliate associate program of the **Corporation for Open Systems International** (COS), the organization working on multivendor interconnection and interoperability.

"DPMA has a history of joint involvement with others to further common goals. By joining COS, we continue this practice and join the major effort to bring open systems architecture to our marketplace," said DPMA President Christian G. Meyer.

Four **Andersen Consulting** users groups have consolidated their work under a worldwide user organization known as A Shared Solution in Software Technology (ASSIST). The organizations uniting to form ASSIST are MAC-PAC, Method/1, DCS and System 38. ASSIST has scheduled its first conference for May 17-19, 1989, in Chicago.

Elliot C. McEntee has been named president and chief executive officer of the **National Automated Clearing House Association** (NACHA), which is

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Monsanto's MIS stars rise two ways

BY ALAN J. RYAN
CW STAFF

ST. LOUIS — A year ago, the only way for Monsanto Co. to recognize its MIS talent through promotions was to move those stars away from their areas of hands-on technical expertise and into management or supervisory posts.

Today, that has changed. The information systems leaders realized that every technical person might not necessarily consider management as his goal and that not all technical people will make effective managers.

So, the single career path was widened to a dual career path that now includes a technical advancement ladder.

It is an unusual individual who possesses both technical and managerial skills, said Leonard Cohn, Monsanto's vice-president of information systems. But the peer pressure and organizational pressures within Monsanto, like so many companies, left people feeling compelled to strive for the management jobs. If the individual found that management was not his calling, "It became difficult to backtrack — to swallow your pride" and accept a lower-level job, Cohn said.

The idea for the technical advancement program was not an original one within Monsanto's MIS confines, Cohn said. The program was modeled after Monsanto's dual-career path option for its scientists, the Science Fellow Program, which allows the company's skilled scientists to climb the ladder through either scientific or managerial routes.

For the MIS career path, Monsanto created three new position levels: systems technologist, senior systems technologist and distinguished systems technologist. Personal and financial opportunities are equivalent to those available in management positions, the company said.

Within the MIS department, "Promotions are based on creativity, initiative, motivation and exceptional achievement in areas of expertise valuable to Monsanto," such as the application of information technology to problem analysis, business application evaluation and integration, data management and database systems and security systems, Cohn said.

The pool of talent for the new positions consists of approximately 600 people in areas such as programming, systems analysis, operation systems support and applications development and support.

Early last month, two individuals were promoted to jobs holding the new technical titles, he said.

"The real thrust was to find a way to provide recognition and, hence, motivation to those who have demonstrated that they are superb specialists in the use of technology and give them a way to achieve recognition," Cohn added.

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a trade association representing 42 U.S. clearinghouse associations.

McEntee, who will join NACHA in mid-November, is currently associate director of the Division of Federal Reserve Bank Operations for the Federal Reserve Board.

NACHA also announced quarterly production of an ACH Participant Directory, which will contain current information on the Federal Reserve's Composite Receive File and membership status codes. Other information relates to the type of institution, a contact name and an association number.

The **National Office Machine Dealers Association** (NOMDA) is consolidating its four-event regional show format into a two-show format with plans for an East Coast show in Orlando, Fla., scheduled for March 1-3, 1990, and a West Coast show scheduled for Nov. 2-4, 1989, in Long Beach, Calif.

MIS managers used to complain that too many conferences were too broadly targeted. That doesn't appear to be the case with **Imagineering '89**, which is scheduled for May 14-16 in Milwaukee. It is a national conference of motor vehicle department officials who are interested in electronically automated administration. Information is available from John F. Uhler, Wisconsin Department of Transportation, Division of Motor Vehicles, P.O. Box 7911, Madison, Wisc. 53707.

Another focused conference is soliciting papers. It is the **International Symposium on Computerization of Material Property Data**, and it will be held Nov. 30-Dec. 1, 1989 in Orlando, Fla. Abstracts can be sent to Dorothy Savini, American Society for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103.

In the "But will the MIS managers buy it," category is a new service being offered in the Chicago area. **Data Center Services, Inc.** (DCSI) of River Grove, Ill., is a company that claims to recognize the need for cleanliness in data centers. Run by Phil Marino and Peter Cikesh, who have a 15 years of experience in data center installation and maintenance between them, the company provides subfloor vacuuming and tile cleaning.

The firm said it lifts the raised floor tiles and vacuums the subfloor to reduce the possibility of downtime and fire hazards. The tile-cleaning process reportedly reduces static. Some customers include IBM, McDonald's Corp., AT&T, Kraft, Inc. and Sara Lee Corp., Cikesh said.

MIS message

year. The magazine is intended as a way of informing managers in various departments throughout Metropolitan's domestic offices and affiliated companies about emerging technologies and other issues relating to MIS, Editor Paul Steinfeld explained.

Steinfeld said the publication addresses emerging technologies, reasons for considering them and where to get more information about them. For the nonmanagerial users, there are technical newsletters to keep them informed of MIS issues, he said.

At Touche, Ross & Co. in New York, an innovative program was begun more than six years ago to keep users in the know. The company has a seven-member microcomputer support center staff to give the users a place to turn with questions or problems; it publishes four or five bulletins monthly on various topics.

Magazine poll

The support center staff annually polls each user on which of the seven types of technical bulletins published by the group he would like to receive. Topics include a general-interest bulletin and others geared specifically to software, hardware, operating systems and communications, according to Ronald Jenks, partner and director of information services at the firm.

Jenks said the support center's charter is to conduct research and comparative evaluations of new products that might be of interest to the user community. In accordance with that, the group tests printers, software, portable and transportable personal computers, presentation equipment, slide-making equipment and other products from various vendors.

After each evaluation, a bulletin is put together discussing the category of product evaluated, the brand names looked at and the merits or drawbacks of each. "The bulletin describes one and also tells why the others don't stack up to the one we selected," Jenks said. If none is appropriate, the bulletin notes that as well, he added.

Newsletters are also popular at North American Philips Corp. (NAPC) in New York, where the user population receives a newsletter entitled "Technology Topics," and through the mainframe-based IBM Professional Office System (Profs) E-mail system, which has a potential audience of 8,000 users within the company.

The newsletters are exceptional in that NAPC publishes them using a different desktop publishing package each time. "While you recognize it as the technology newsletter, it is different each time, and we tell people which package we used to do it," said Thomas O'Leary, Jr., director of MIS technology.

Through Profs, NAPC users can read the NAPC bulletin board, which includes categories like new technologies and data center information, among other topics, O'Leary said.

"When you log onto the E-mail system, a banner comes up and tells you if something has changed in that section of Profs," he explained. Other methods of disseminating information include periodic workshops and informally, by word of mouth.

The educational seminars and classes aimed at briefing users on emerging technologies and more efficient methods of utilizing information technology are also frequently used at the other companies polled by *Computerworld*.

Metropolitan's Steinfeld said his company holds a three-part executive seminar series annually in conjunction with *Perspectives on Technology*. Those sessions are videotaped and kept in the corporate library so they can be used as a resource for people not in attendance.

"It would be nice if we had a more rigorous approach to keeping the users informed," Humana's Vincent said. "But this is a type of network that is built up over time, so we aren't about to dismantle it."

Connolly

same note. IS must learn about the business side and the pans of the business, which requires taking the affirmative step of drawing out of end users their specific needs and goals.

The speakers discussed project management and carefully outlined what they have done to lay out plans that relate to the business goal and specify how much a new system has cost at a particular point in time, and how costs will change. Such an approach requires a methodology that allows the IS executive flexibility to adapt the plans for changing business climates and technological innovations.

No one seems to advocate that IS develop a plan and stick with it. Such an approach would be foolish in today's business environment. But the continued references to planning are further proof of how the IS executive's job is changing.

The days are gone when IS planning consisted of tracking how many MIPS, terminals and programmers were needed or affordable. Today's plans have to consider what the competition is doing, what type of hardware and software platforms will be needed, when the system is delivered and — of greatest importance — whether the benefit to the company through increased sales or reduced costs justifies the IS strategy.

Connolly is *Computerworld*'s senior editor, management.

Can your async network pass this simple test?

Trump Plaza

replace three IBM Sys-tem/38s that are quickly reaching their limit. Each System/38 is dedicated to one of the Trump Plaza's main functions: a hotel system, a finance system and a casino system that is used to track and rate the gambling customers.

The MIS strategy downplays technological gambles in favor of cautious spending on proven technologies, Meldon says. The local competition is tough because most of the casinos are working on similar systems, so gaining the edge by using computers more effectively than the others is important, he adds.

One way Meldon sees the Plaza using the technology to gain an edge is through its credit-card-like Trump Card system, which allows gamblers at approximately 50% of the casino's slot machines to gain credit toward meals and rooms, Meldon says.

The technology involved for that is an old Digital Equipment Corp. PDP-11 tied into slot machines that have magnetic card readers built onto them. When the player wants to track his spending, he can insert the Trump Card into the machine. The information passes through the PDP-11 to the System/38.

For in-house security, the Plaza has a Hewlett-Packard Co. HP 9000 mid-range computer. Plaza employees are issued cards that act as time cards for hourly-wage employees, grant admittance to the cafeteria, where each employee receives free meals, and allow controlled access to various parts of the building. The employee holds the card in front of a beam of light which allows or denies access to an area. If granted, the access is automatically recorded with the employee's identification number on a printout in the computer room.

The HP 9000 is also used to handle the complex schedules of dealers for the casino floor. Dealers work nine-hour shifts, alternating one-hour on-duty stints with 20-minute breaks.

The HP-based scheduling system, written by an outside vendor for the Trump Plaza, automates tasks that casino administrator Roger Martel did by hand in other casino jobs. He tried to write the program on a personal computer at his home, which had disappointing results because the task was too complex for a PC.

Nearly all of the PCs are IBM-made, Meldon says. The Plaza has standardized on IBM Personal System/2 Model 30s under Meldon's direction. "It is tough to standardize on PCs, because everyone has used different systems that they think will be better for them. Some people want to use Apples," Meldon says. But by standardizing, the MIS staff will be able to more efficiently service users, he adds.

Another Trump Plaza challenge is to keep people coming back. "Direct marketing seems to be the most effective way to reach people today, and it is a big issue for us," Swanseen says. "We have a half-million people on our international database, so we try to establish a rapport with them."

Direct mailing for Trump events are coordinated according to the types of players they are most likely to attract. The system tracks such players by colors that correspond to the value of the chips that they typically shuffle across the felt-covered gaming tables.

Bettor way

The three strategic systems the MIS department is betting on at Trump are designed to work together to keep the entire operation running without snags.

The finance system needs to be, and is, sophisticated enough so that Paul Chandler, casino credit manager, can do a background credit check on those seeking a gambling credit line within minutes. "We're solely reliant on MIS," he said.

The credit that Chandler grants is used primarily at the gaming tables, with just 10% being used at the slot machines. The systems keep track of who is winning money, who is not, who had the biggest win today, the biggest loss and the average bet of each gambler. That information is entered into the system right in the gambling pits by the pit clerks, who get the information from the pit bosses. If a person wants his credit increased, Chandler looks at his current standings in the computer.

In the casino system, information about gamblers is used to rate them as players. Those ratings are then used to determine which players will receive complimentary dinners in the hotel's restaurants, tickets to shows or free rooms.

The hotel system is used to keep track of which of the hotel's 566 rooms are rented, which are vacant and which are vacant and clean. According to Tony Alves, the front office manager, each maid picks up the room phone when the room is clean and dials in a code. This alerts the system that the room is available for occupancy.

The hotel system also tracks reservations and cancellations.

ALAN J. RYAN

COMPUTER INDUSTRY

Look into my crystal ball

Suppose you could jump into H. G. Wells' fabled Time Machine and drive it to Armonk, N.Y., four years from now. What would IBM look like in 1992?

It may sound fanciful, but the strategic planning types at IBM's competitors put bread on their tables by thinking about these things. A Boston consulting firm called Northeast Consulting Resources has spent a good bit of time in the last several months thinking about it in producing a report for the top executives of 50 of those competitors.

At the recent Seybold Executive Forum in Cambridge, Mass., Northeast Consulting showcased its copyrighted "Future Mapping" prognostication technique with IBM as the guinea pig.

Northeast Consulting Vice-President David Mason mapped out five possible scenarios ranging from the predictable to the revolutionary. They are listed below, with this observer's opinion as to their likelihood.

Scenario 1: Conventional wisdom, in which the IBM of 1992 will closely resemble the IBM of today: controlling the mainframe and storage markets, slowly diversifying into

Miller spins straw into gold

Enterprising former DG exec finds a niche in market for RISC technology

BY J. A. SAVAGE
CW STAFF

SUNNYVALE, Calif. — In the year since Bob Miller took over as president of Mips Computer Systems, Inc., the company has grown so much, he is already looking for a new building. To Miller, this is a unique opportunity.

"In Silicon Valley, you know a company is really successful when they have three fountains," Miller said in a recent interview. "In the new building, I'm going for four. That's the ego," he said.

Mips, a privately held, reduced instruction set computing (RISC)-based company, splashed into the big time last month in September when Digital Equipment Corp. agreed to distribute its technology in return for 5% ownership of the company and

an option for another 15%. DEC also has the right — but has not acted upon it — to add another member to Mips' six-member board.

Formerly second in command at Data General Corp., Miller said he offered the Mips architecture to DG before going to rival DEC, but it did not take the bait.

Miller said he does not care whether his systems carry the logo of Mips, DEC or any other company, as long as Mips' brand of RISC architecture is in the marketplace. Apple Computer, Inc. has let it be known that it is considering Mips' architecture to rival Sun Microsystems, Inc.'s Scalable Processor Architecture, or Sparc, chip. There appears to be an outside chance that IBM will carry the technology, although Miller doubts that will happen in the near future.

"My feeling is that IBM will continue to use their RT basic 801 architecture. They've made a lot of investments in it," he said.

Still, Miller would like another distribution channel the size of DEC's. While reluctant to sell off any more pieces of the company, Miller said that for the one or two companies out there with the market impact of DEC, he would entertain the idea.
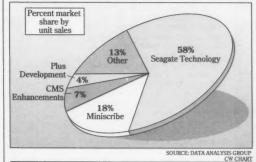
Mips has been able to grow as fast as it has — from deep in the red only a year ago — by cutting its commitment to chip manufac-

Mips' *Miller has four-fountain ambitions*

Lion's share for Seagate
Second-quarter U.S. retail unit shares for hard disk drive vendors

Percent market share by unit sales

- 58% Seagate Technology
- 18% Miniscribe
- 13% Other
- 7% CMS Enhancements
- 4% Plus Development

SOURCE: DATA ANALYSIS GROUP
CW CHART

Weiler at helm of Cullinet

BY NELL MARGOLIS
CW STAFF

WESTWOOD, Mass. — In April, Cullinet Software, Inc. President George W. Tamke — in the wake of a sweeping executive shuffle that left him the sole survivor of the old guard — singled out Executive Vice-President Robert K. Weiler for praise,

saying that Weiler's role "will do nothing but expand in terms of responsibility and importance" in the new administration.

Last week, Tamke was proven correct when Weiler replaced him at the company's helm.

Tamke, who resigned from his offices as Cullinet's president, chief operating officer and director, could not be reached for comment. "I expect him to surface at another company extremely soon," his successor said. "He's a very talented guy."

Cullinet executives and industry analysts viewed both Tamke's exit and Weiler's ascension as marking not a resurgence but a completion of this

IBM Korea keeps a low-cost profile

BY LORI VALIGRA
IDG NEWS SERVICE

SEOUL, South Korea — As a general rule, IBM is not the lowest priced vendor in a given bid situation. But when you are IBM Korea, keeping costs low is the key to your very existence.

"People want high function and low cost," said Son Yong-Ho, director of technical support at the IBM subsidiary here. "That's a big challenge here, because the economy cannot support expensive units. My responsibility is to make low-cost products."

Not only must Son keep costs and prices down in the domestic

South Korean market, he must also keep a lid on expenses for supplying displays and other computer components to other IBM facilities worldwide.

IBM Korea is a net exporter within IBM's International Procurement Office (IPO) operation, which matches demand with manufacturing ability at IBM plants around the globe.

Won up on the dollar
Exports are becoming a problem for IBM Korea because of exchange rates. South Korea's currency, the won, appreciated some 12% against the U.S. dollar in the past year, partly because the recent Olympic Games

brought a new flow of international influence into the country's relatively homogenized market. And that appreciation makes export prices higher.

"If we compete in the U.S. market, the supplier and export costs here must be lower than U.S. production costs. Otherwise, we will not have a business here," Son said. He also said that putting in more locally procured components helps keep costs in line and minimizes effects of currency fluctuation.

One reason IBM turned to local procurement before it began selling its Model 5550 Korean Personal Computer in 1986 is that the South Korean govern-

ment had a requirement that products sold in the country have 50% or more local content. That requirement was lifted in April.

"We still try to use more local components because of costs," Son said, noting that doing so eliminates the duties that would be levied on comparable imported parts.

Competitive bids
To get components for the 5550, IBM Korea held competitive open bidding, as it has no manufacturing of its own in South Korea. Hyundai Electronics makes the control unit, and the Goldstar Group makes 5550 peripherals such as printers, keyboards and displays.

Unlike the display made for

South Korea, which requires a 2-byte architecture to handle Korean Hangul ideographs, the export models are single-byte and handle alphanumerics common in Western countries. Korea is now the largest supplier of monitors to IBM. Other IPO exports include banking terminals, components, semiconductors and cables.

Market demand now is for small computers, but in five years, larger systems will enter the picture, Son predicted. IBM set the stage for this development Aug. 3, when it announced it will support the South Korean Standard 2-byte code for Hangul on its mid-range and larger systems, including the Application System/400, 9370 and 3090.

Europe, Japan, U.S. patent groups meet to unify systems

TOKYO — Members of patent offices in Europe, Japan and the U.S. began preliminary meetings here last month, which were aimed at harmonizing the patent systems in their respective countries.

The three geographic areas represent 80% of the patent applications globally, said Hajime Aburaki, a director at the Japanese Patent Office, at a press conference.

Aburaki said the resolutions of the Tokyo meetings should help the World Intellectual Property Organization (WIPO), which handles worldwide intellectual property rights and formulates policies.

Patent debate

One area of lingering debate is the U.S. policy of granting patents based on innovation vs. Japan's practice of granting patents based on a first-to-file system. Additionally, the three geographic areas are working on a computerized system to exchange patent information, parts of which are already up and running.

Some of the other aspects mulled in Tokyo include the period for which a patent is granted, patentability, interpretation of patent claims and how to handle raising opposition to findings of a patent examiner.

Japan has been criticized by other nations for how it interprets the scope of patent claims, the U.S. for the period of its claims and Europe for what it considers patentable.

This marks the sixth trilateral meeting to take place for the purpose of working on patent processes and definitions. There are many meetings throughout the world regarding patents: trilateral ones, bilateral ones between the U.S. and Japan and others held by the WIPO.

What's done is done

Stating that he has accomplished what he set out to do — make the company's business-productivity software line competitive and expand international sales — Micropro International Corp. Chief Executive Officer Leon Williams stepped down last week. Replacing Williams in the front office is former Vice-President and Chief Operating Officer Gari M. Grimm.

HP II

A quest for reporting simplicity and closer ties with sales and distribution channels led Hewlett-Packard Co. to reorganize its computer business late last month. The new HP configuration features two principal sectors. Computer Products, which concentrates on single-user targeted products such as personal computers and workstations, will be headed by Executive Vice-President Lewis Platt. Networked Systems will handle multiuser systems under the stewardship of Executive Vice-President Douglas Chance. Four of the groups formerly making up the Systems Technology Sector — Peripherals, Information Networks, Networked Systems and Computer Manufacturing and Planning — will be folded into the two new sectors.

DB2 on the horizon

Parsippany, N.J.-based software development and management consulting firm Computer Horizons Corp. leaped onto the rolling IBM DB2 bandwagon when it acquired Hartford, Conn.-based data processing consultant Comptech, Inc. Comptech is a company that specializes in database technology consulting, including a range of services related to DB2.

Go West, young Richard

Reston, Va.-based VM Software, Inc. is reaping another benefit from its October merger with The Systems Center, Inc. in Irving, Texas — this time, a president. John (Jack) Barry, president of The Systems Center since 1984, will become president and COO of VM Software as of Jan. 1 — allowing current President and COO Richard L. Earnest to follow through on his personal plans to relocate to the West Coast.

The Apollo also rises

The continuing OEM relationship between Apollo Computer, Inc. and Mentor Graphics Corp. last week netted Apollo its largest contract ever: more than $100 million in sales of workstations, servers and related products to Mentor over the next 18 months.

Weiler

past spring's executive reorganization. At that time, John J. Cullinane returned from retirement to retake the reins of the company he founded, ousted his hand-picked successor, David L. Chapman, and triggered the resignation of a number of executives seen as Chapman loyalists.

"The whole Chapman team, including George, was brought in for a purpose, and they served it well," said Robert Anderson, an analyst at Sutro & Co. in San Francisco. The Chapman administration's mission, he said, was to implement a large-scale technological turnaround at a company seen as foundering on outdated technology, while simultaneously imposing solid corporate structure on a disorganized entity that had outgrown its entrepreneurial size and state.

"Chapman and Tamke brought that kind of structure from their years at IBM," Anderson said. Chapman also brought in Weiler and John B. Landry III, now Cullinet's executive vice-president of development. Landry served as the software development counterpart to Weiler's much-lauded marketer both at financial software giant McCormack & Dodge Corp., where their efforts were seen as instrumental to the company's

Cullinet's Weiler

rise, and then again at Distribution Management Systems, Inc., a software development company bought by Cullinet in 1987. "Weiler and Landry are the future of Cullinet," Anderson said.

"They've been pioneers and innovators everywhere they've been," said Charlotte Walker, an analyst at County Securities Corp. U.S.A. "They've driven the new strategy at Cullinet."

The strategy, which is backed by a slew of recently issued Cullinet products, repositions the firm as a supplier of flexible applications and development tools across a variety of hardware platforms.

TI's OmniLaser™ 2115. The network printer you need when your application needs are demanding.

The high-speed laser printer for shared-resource environments that can handle many people performing many tasks.

TI's OmniLaser 2115 printer provides the flexibility you need in multi-application environments. Especially where you have several different hardware systems attached to a network.

Built-in emulations mean an OmniLaser can satisfy the needs of virtually any application. It can produce desktop publishing output using the Adobe PostScript® page description language. It can emulate a dot-matrix printer for spreadsheets and draft text. Or an HP LaserJet® for word processing and business graphics. Even a plotter for advanced graphics.

Best of all, with speeds of up to 15 pages per minute and a duty cycle of 25,000 pages per month, it can satisfy the needs of even the busiest group of professionals.

You can connect an OmniLaser to virtually any computer or network. It features multiple standard interfaces for IBM®, DEC®, Apple®, even specialized hardware like CAD/CAM workstations.

Trouble-free paper handling.
The OmniLaser 2115 prints beautifully on a variety of paper stocks and sizes. Its two 250-sheet paper trays let you load stationery, letter- or legal-size paper, and select the size you need through its easy-to-use front control panel.

The right printers for right now, and in the future.
With the OmniLaser 2115, you have the flexibility you need for today's sophisticated printing applications. You also have the confidence of knowing that your OmniLaser offers a safe path to the applications of the future.

The OmniLaser family also includes the 2106 workstation printer and the 2108 small-cluster printer. So whatever the demand of your application, there's a multipurpose OmniLaser that's right for you.

To find out more, call Texas Instruments toll-free 1-800-527-3500.

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NICKLES & DIMES

Britton Lee, Inc. reported a net loss for the third quarter ended Sept. 30 of $786,000 on revenue of $6.6 million, compared with a net loss of $328,000 on revenue of $7.7 million for the third quarter of last year. The net loss per share was 9 cents, compared with a net loss of 4 cents per share in the comparable period last year.

Policy Management Systems Corp. announced revenue for the third quarter ended Sept. 30 of $55.4 million, compared with $46.2 million last year. Profits were $5.3 million, or 33 cents per share, compared with $4.4 million, or 27 cents per share, in the like period last year.

Computer Consoles, Inc. announced revenue for the third quarter ended Sept. 30 of $44.9 million, compared with $37.8 million last year. Profits were $3.4 million, or 24 cents per share, compared with $612,000, or 5 cents per share, last year.

American Management Systems, Inc. reported revenue for the third quarter ended Sept. 30 of $53.7 million, compared with $44.7 million last year. Profits were $625,000, or 6 cents per share, compared with $1.9 million, or 18 cents per share reported last year.

Concurrent Computer Corp. reported a net loss for the first quarter ended Sept. 30 of $370,000, or 2 cents per share, compared with net income of $1.3 million, or 8 cents per share, in the comparable period last year. Revenue for the quarter was $18.7 million, compared with $20.3 million reported in the like quarter last year.

Network Equipment Technologies, Inc. announced revenue for the second quarter ended Oct. 2 of $32.2 million, compared with $20.5 million a year ago. Profits were $3.7 million, or 27 cents per share, compared with $4.3 million, or 31 cents per share, a year ago.

EMC Corp. announced revenue for the third quarter ended Oct. 1 of $28.9 million, compared with $34.2 million last year. Profits were $276,000, or 1 cent per share, compared with $7.9 million, or 34 cents per share, in the previous year.

Interleaf, Inc. reported net income for the second quarter ended Sept. 30 of $123,000, or 1 cent per share, compared with $968,000, or 8 cents per share, in the comparable period a year ago. Revenue for the quarter increased 44% to $18.4 million, compared with $12.7 million reported in last year's like quarter.

Chips and Technologies, Inc. announced revenue for the first quarter ended Sept. 30 of $44 million, compared with $29.6 million last year. Profits were $5.7 million, or 39 cents per share, compared with $4.7 million, or 33 cents per share, last year.

Entertainers Cesar Romero, Pat Boone and Jaclyn Smith were among those present last week when President Reagan signed legislation that will enhance international copyright protection of U.S. software and other intellectual property, including motion pictures, recordings and books. The bill makes the U.S. a member of the Berne Convention, a 102-year-old treaty among 76 nations pledging adherence to minimum copy protection standards.

The next generation of desktop computing will take us from being gatherers of data to being cultivators of information.

© 1988 Metaphor Computer Systems.

Miller

turing and making deals with 20 other companies.

When Miller took on the job of president, chief executive officer and chairman of the board in early 1987, it was clear to him that neither he nor his new management wanted to be in the semi-conductor business in 1992. The firm was originally conceived to compete with National Semiconductor Corp. and Intel Corp.

"We didn't have a foundry," Miller said. "We didn't even have a tester. We bought time on other people's testers."

Yet, Miller was sold on the technology, so he started licensing the chips to semiconductor companies for manufacturing.

That not only got Mips out of the semiconductor business, but Mips profits each time its semiconductor partners, such as LSI Logic Corp. and Performance Semiconductor make a sale.

"If a semiconductor partner goes out tomorrow and sells to an aerospace company that needs the chip, we can count on $1 million worth of business coming behind that, just for all the tools they'll need to develop the product and use that chip," he said.

Along with its semiconductor partners, Mips aggressively recruited OEMs, value-added resellers and distributors.

Horizontal incline

Miller said that he had an advantage joining Mips in the late 1980s, because he did not inherit a vertically integrated business.

"In the '60s and '70s, if you weren't a vertically integrated company, you couldn't effectively compete on cost; at least that was the buzzword," Miller noted. "Now, if you're not horizontally integrated, you can't compete on cost. All the old vertically integrated companies are trying to get out of vertical integration and become horizontally integrated."

Miller's first glimpse of Mips' technology came when he was at DG, but he ended up canceling the Mips chip product because there was no software to go with it.

Miller likened RISC technology in the late 1970s to a motorcycle capable of 125 mph but that comes with an elephant of a

> "IN SILICON Valley, you know a company is really successful when they have three fountains."
>
> BOB MILLER
> MIPS

passenger — namely the software. "Once the elephant sat on it, it could only do 5 mph," he said.

By the time Mips' venture capitalists asked Miller to take the job, he felt the expertise existed to get the elephant off the motorcycle.

Now that the technology is finding a niche in the marketplace, Mips is branching out. The company plans to introduce a computer based on emitter-coupled logic (ECL) chips as well as its standard CMOS-based processor. Miller said it will offer performance of about 60 million instructions per second.

ECL technology was an integral part of the DEC license, Miller said. The new systems will be much faster but are expected to carry an increased price tag for the higher performance.

"ECL is the Ferrari, the high-performance machine. The Honda is the CMOS. You need the Ferrari about the percentage of time you'll need the ECL system."

Choose this,

Everyone's computing needs are unique. Which is why different people choose different solutions. And why so many diverse computing environments are being used today.
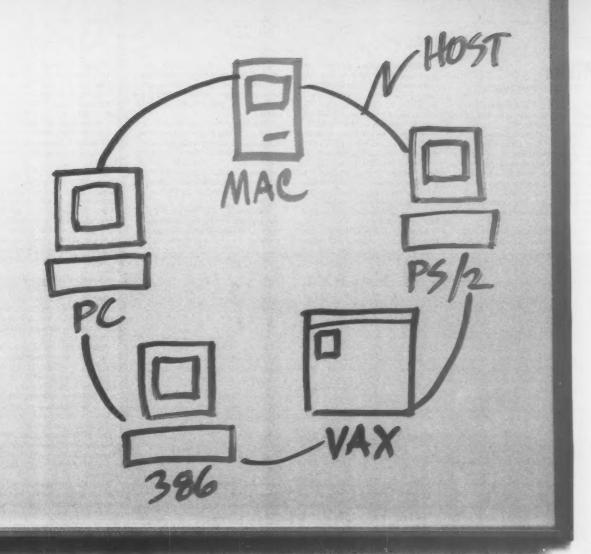
While this variety of solutions makes it easy for users to meet their needs, it presents some problems. Like sharing information between incompatible systems. The kinds of problems facing more and more companies as their information systems grow and diversify.

Novell means freedom. Fortunately, you can solve those problems by making one simple choice: Novell. Novell's NetWare® operating system software supports a myriad of computing environments.

That means you have the freedom to network everything from PCs to Macintosh, VAX to PS/2, 386 to mainframe host systems. So everyone can use the workstations they choose, without changing the way they work.

The power to choose. With NetWare, Novell gives you the most powerful combination of network performance, security,

and you can choose all of these.

functionality and system reliability available. Plus you get the power to transparently connect to any of the more than two million users worldwide who have already chosen NetWare.

And as your computing needs expand, the network will grow with you. Giving greater networking capability and allowing you to connect to new environments.

The freedom to choose. Exercise your freedom to choose the desktop environment that best meets your needs. Choose the networking power of NetWare. See your

Gold Novell Authorized Reseller, or call 1-800-LANKIND.

For more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter the access code NVFRE7.

Wilder

higher growth areas such as systems integration but still missing its revenue and earnings growth targets.

Opinion: Nah. John Akers wants to leave behind a much better legacy than that, and he'll be willing to take bigger risks. He's already presided over the most massive redeployment and one of the most significant management realignments — the creation of IBM United States this year — in the company's history. If those don't work, he'll try something else.

Scenario 2: Enterprisewide domination — in Mason's words, "The IBM that IBM *wants* to be." In this scenario, the standards war will continue to rage and users will cling to the safe haven of IBM's proprietary architecture. The mainframe will rule supreme, and IBM will cash in on its mammoth R&D spending with realizable breakthroughs in voice recognition and expert systems.

Opinion: Even less likely. The days of all-Blue account control are over, and we'll never go back. Once the "You'll never get fired for choosing IBM" stranglehold was broken, an entire spectrum of competitors rushed through the door. Can IBM succeed in this world? Of course. But never again with the dominance it once had.

Scenario 3: IBM falters. It's the Blue nightmare, complete with the spec-ters of IBM's first layoff in 1989, a successful Unix-based minicomputer from Hyundai in 1990, a market-demanded, *non*-SAA-compatible IBM workstation in 1991 and a keyboardless micro from Apple in 1992.

Opinion: Parts of this one make sense, such as faster-than-expected mainframe sales declines and disappointing results from SAA — "Too little, too late and too expensive," Mason said. But to envision IBM steadily going down the tubes with "repeated product failures" and "internal chaos" seems a bit far-fetched.

Scenario 4: IBM emerges as a service provider — EDI, transaction processing, corporate lending, systems integration and so on — and renames itself International Business Services.

Opinion: Now things get interesting. Services, to no one's surprise, are the wave of the future, and IBM is likely to flex its large corporate muscles in this direction. But despite corporate America's renaming trend, I don't believe the House of Watson would take kindly to a name change, even if the firm's international business moves away from machines.

The corporate lender prediction is intriguing. Mason pointed out that the huge Japanese conglomerates such as Hitachi not only do a major business in this area but actually subsidize their manufacturing with the profits gained from their sterling credit ratings. The thought that IBM could play the same game sounds plausible — especially if worldwide capital expenditures (read: mainframes) take a dive.

Scenario 5: IBM breaks into four companies. These would be 370 systems and storage; Personal Computers, midrange boxes and servers; communications; and services such as leasing, systems integration and value-added network services.

Opinion: Favored by Judge Greene and the U.S. Justice Department — in a Democratic administration. It sounds extreme but is really only a leap of faith away from what IBM is trying to do today — push more and more responsibility down to the line managers, under Terry Lautenbach's direction, to better compete with more nimble rivals.

Under this scenario, IBM's R&D organization would be shared among the four companies the way Bellcore is owned by the seven regional Bell holding companies.

What this ignores, however, is the IBM strategy embodied by SAA to bring everything together via the software. If the SAA effort fails, perhaps IBM would consider something as extreme — the strategy is that critical. In fact, monitoring the progress of SAA is probably the best crystal ball to see what IBM will look like in 1992.

Wilder is Computerworld's *senior editor, computer industry.*

IBM Korea
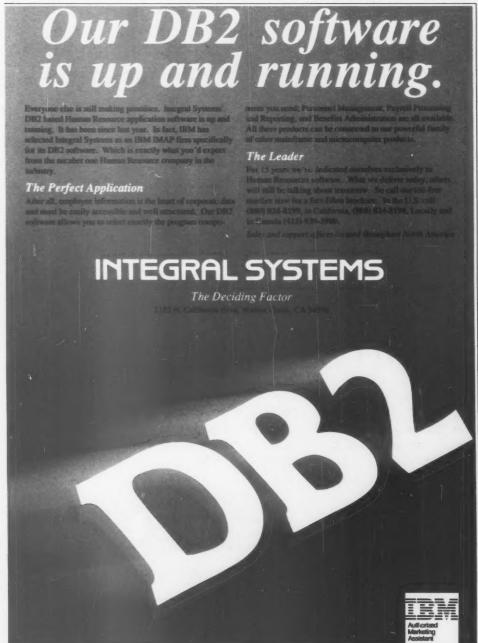
"The hardware is becoming very sophisticated here," Son said, explaining that some local producers have announced 32-bit PCs. But Korea still lags a few years behind Taiwan and even more years behind Japan in its domestic PC industry. About 70% of PCs are still connected to host computers, while only 30% are used in stand-alone applications.

Software development still is in the beginning stages. While Son said it is not difficult to convert off-the-shelf U.S. programs to Hangul, such changes have been minimal to date. That is because South Korea instituted a copyright law for software only as of July.

So far, Ashton-Tate Corp.'s Dbase III, Microsoft Corp.'s Multiplan and Lotus Development Corp.'s 1-2-3 have been converted. To meet local and export demand, Son's future strategy is simple: "I want to survive in product quality, functions, cost and price. We must lead the industry in those areas, otherwise we won't survive."

In search of net management

Though hard to find, these posts offer challenge, mobility, earning power

BY JANET MASON
SPECIAL TO CW

The job of network manager has been called one of the toughest to be found in MIS. But those working in the field concur that the challenge of specializing in mainframe- and Digital Equipment Corp. VAX-based corporate backbone networks enhances job satisfaction as well as earning power and career mobility.

The job of communications manager — before the wide-scale integration of voice and data and the proliferation of telecommunication carriers — was simple and well defined. The opposite is true of the position of network manager, which requires a depth and breadth of skills.

Because of the position's complexity, some industry observers say there is a sellers' market for people who fit the bill.

Small pool

"People who manage networks are in demand, because there are not a lot of people who have the necessary skills in voice and data," says Ivan Frisch, director of the New York State Center

for Advanced Technology in New York.

Steve Joffe, vice-president of recruiter Source EDP in San Mateo, Calif., agrees but says the market for network managers in large corporations peaked several years ago.

Joffe adds, however, that large companies — especially banks that require networks to transfer funds and other information — are still a steady source of demand for network people.

According to Carol Mason, president of Careers Management Associates, Inc. in Bala Cynwyd, Pa., there are also career opportunities in small research and development companies that track emerging methods of interconnectivity. "There are always high salaries for network specialists who can handle projects from feasibility studies to design and implementation," she says.

Network managers who are working in corporate MIS departments will find the most growth in organizations that are looking at their networks to support business applications, according to Algus Leveckis, managing associate of Index Group, Inc. in Cambridge, Mass. He says network managers may find dead ends in organizations that use data and voice networks

sparingly as service utilities.

People working on the software side of network management often come from a background in systems analysis. People on the hardware side typically begin their careers in computer operations or telecommunications.

Network management also requires management acumen.

> "THERE ARE always high salaries for network specialists who can handle projects from feasibility studies to design and implementation."
>
> CAROL MASON
> CAREERS MANAGEMENT ASSOCIATES

"The network manager position is not for someone right out of school," Frisch says. "In addition to knowing the technicalities, the person has to be able to manage the network team, customer support and the help lines."

Long to learn

There is greater demand for people knowledgeable about network software because it takes longer to learn the software than the hardware, according to Mike Blumer, vice-president of information systems at The Franklin

Mint in Franklin Center, Pa.

Depending on the company and geographic location, network managers involved with software can earn annual salaries of $27,000 to $45,000, according to Joffe.

Network operators, who have moved up from computer operations, earn from $18,000 to $29,000, he says, about 20% more than computer operators.

In many companies, the role of the network manager is handled by several people in different departments. At Ramada, Inc., the Phoenix-based operator of inns, network management is split among corporate accounting, reservation processing and an operations department, according to systems programmer Jean Quinsey.

Quinsey moved into her current position as a network software manager from an IBM CICS applications programming background.

The software areas she was required to learn included the network control program and VTAM software, which runs on Ramada's IBM 4381-based mainframe and 3720 communi-

cations controller.

Rick Landry brought a telecommunications background to the hardware side of Ramada's network. "I started out climbing telephone poles and pulling cable," says Landry, who is now manager of communication systems.

After being hired by Ramada to work on a local private branch exchange switch, he began to learn about data circuits and mainframe and front-end processor communications. "Learning data communications gave me the ability to expand into my present position with the reservation center," he says.

Bigger challenge

Quinsey finds the technology of network software much more challenging than traditional applications programming and analysis. "The technology of applications doesn't change that much," she says. "With the network, there is always a new technological solution."

Since a good deal of network technology is common to MIS departments across industries, specializing in network software allows a great deal of mobility. "There's a lot of opportunity to move from company to company," Quinsey says.

"Once you have the experience, it's very valuable, and three years of hands-on experience in this field is a big investment," she says.

Mason is a Philadelphia-based freelance journalist.

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After the 3090 S announcement

Price slide for 3090 base models continues as users swap for S machines

BY MARY JAKUBOWICZ
IDC FINANCIAL SERVICES CORP.

Large-scale secondary market activity remained at a standstill for several weeks after IBM's much-anticipated Enterprise System/3090 S announcement in late July. Because of the complexity of upgrade options and financial incentives, most users found that a three- to four-week time frame was necessary to completely decipher and evaluate the new IBM mainframe options that lay in front of them.

In late August, the dam finally broke. Secondary market activity began to resume as end users felt they had IBM's latest mainframe puzzle solved. Used trading for 3090 machines — base models as well as E models — started to pick up as some users chose to swap out their existing base and E machines and buy new from IBM while others decided that the used market represented their best bet for a mainframe acquisition.

The secondary market for 3090 E machines was active during late August and into September. According to third-party market contacts, demand was healthy and supply was ample. Since that time, however, the supply of 3090 E models has begun to tighten, and used values for these mainframes have held steady since late September.

IDC Financial Services Corp. has set the fair market value for the 3090 Model 180E and above at 72% of retail, with the exception of the 280E and the 500E, which have not begun to trade actively on the secondary market. The 3090 Model 150E is currently trading a point or two below the larger 3090 E models.

During the second quarter of 1988, the 3090 Model 600E was still unavailable on the secondary market. However, since that time, a used market has developed for this mainframe because of IBM's 3090 S model announcement in late July. According to contacts, most 600E machines that are trading used are upgraded from base-model 3090s.

The 3090 Models 400E and 200E have declined approximately six points on the secondary market since June and July, with the largest part of this decline being realized midway through the third quarter. But since late September, used prices for the 400E and 200E have remained relatively stable.

In late June, a native 400E was available at a used price of 78% retail, while an upgraded 400E was trading at 79% retail. The Model 200E is trading used for the same percent of list as the 400E.

Since the June/July time frame, overall declines for the 3090 base models have been relatively constant. According to current IDC Financial Services research, used prices have fallen approximately 1½ to two points a month since mid-June. IDC Financial Services expects this downward trend to continue for the 3090 base models, as users continue to swap out their existing base machines for IBM's 3090 S models.

Currently, the 3090 Models 200 and 400 are trading used for 60% of retail.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 508-872-8200.

IBM mainframes
Retail current fair market value

3090 Model	Date shipped	MIPS	List price	Retail percent of list price
600E	Second-quarter 1987	76.0	$11,069,500	72%
400E	Second-quarter '87	55.8	$8,544,500	72%
200E	Second-quarter '87	30.8	$4,585,970	72%
400	Third-quarter '86	49.0	$8,544,500	60%
200	Third-quarter '85	27.2	$4,585,970	60%

SOURCE: IDC FINANCIAL SERVICES CORP.
CW CHART

Used Equipment

Bids & Proposals

Time & Services

TRAINING

The price of in-house training

Should you charge a premium price, discounted rates or no fees at all?

BY NAOMI KARTEN
SPECIAL TO CW

If you are going to charge for the in-house courses you offer your systems professionals and end users, what should your courses cost?

In practice, costs vary considerably from one company to another, from less than $50 for a one-day class to more than $750 for a three-day class. But often there is no apparent rhyme or reason to the range of fees for a company's training program.

If you are just implementing a technical or end-user training program or gearing up to bill for an already established training curriculum, there is a range of factors to keep in mind.

Clarify your objectives. Is your objective to cover your expenses for the next budget year or to operate your training center as a profit center? In either case, you need a clear idea of the costs of running the training program, including staff salaries, overhead, equipment, materials and facilities. You also need to know the approximate number of training units (the number of training days multiplied by the number of students per class) you intend to deliver, unless your objective is to instill a sense of value among the students who attend your training and among the managers who pay for it. If so, you have more flexibility in setting fees.

Evaluate vendor fees. Review the fees set by training vendors for the courses you are offering. If your intent is to decrease the demand on a limited training staff and encourage attendance at courses provided by local vendors, you can set prices at vendor prices or higher. If you want to promote greater use of your own training facilities or discourage use of outside vendors, try setting them appropriately below vendor prices.

Establish reasonable fees. These fees should be neither too high nor too low. Low-cost products and services are sometimes perceived as having little value.

Establish consistent fees. A fixed fee per student per training day, regardless of the course, makes planning and budgeting easier for management and tracking easier for the training administrator. Consistent pricing avoids a sense of arbitrariness that might be conveyed by charging $150 for a spreadsheet

I F YOU are just implementing a technical or end-user training program or gearing up to bill for an already established training curriculum, there is a range of factors to keep in mind.

class, $250 for a Cobol class and $350 for an IBM CICS class when each is the same length. As a practical matter, however, it may be necessary to lower the fee for one course to remain competitive with outside vendors or to increase the fee for another course to limit demand or pay for special materials.

Provide advance notice. Give managers sufficient notice of the intent to implement course fees. As budget planning time approaches, it is important to advise managers of fees for the next budget year. Be prepared to work with managers to help them analyze their overall training needs so they can plan realistically. It is especially helpful if you can review their prior year's training in terms of what it would have cost had fees been in effect at the time.

Keep fees fixed. It is best to avoid the impression that published fees are as unstable as personal computer technology. In general, try to set fees that you can live with for a full budget year. If it becomes necessary to adjust a course fee (either up or down), keep the adjustment as small as possible to minimize the impact on long-term training plans and to avoid conveying an image of "let's see what tomorrow will bring."

Formulate a cancellation policy. Training departments may benefit from a cancellation policy that bills departments for no-shows who do not notify the training department of the cancellation by, for instance, one hour before the class.

Charging for a course reduces the number of students who do not show up. Of course, given the priority-interrupt nature of the business world, people will often be prevented at the last minute from attending a course. A waiting list of students who can be called in at the last minute will help ensure that slots do not remain unfilled.

Consider free training for novice end users. In particular, evaluate the pros and cons of offering free training for your introductory course. The plus side is that it is a good way to encourage users to get started and to clearly convey the message that you welcome and support novices.

On the minus side, you may be faced with classes filled with too many of the wrong people. Since almost everyone wants at least a smattering of computer literacy regardless of whether they need it for their job, the free-for-all approach may result in large numbers of students who do not have a good business reason for being there.

Karten is president of Karten Associates in Randolph, Mass.

COMPUTERWORLD

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Issue Date	Topic	Ad Closing Date
Dec. 5	LAN's	Nov. 18
Dec. 19	IBM-Compatible PCs/PS2	
	Market Products/Monitors	Dec. 2

STOCK TRADING INDEX

S&P 500 stock index

CW stock index

Indexes	Last Week	This Week
Communications	99.5	97.7
Computer Systems	93.2	92.7
Software & DP Services	101.7	99.6
Semiconductors	57.0	55.7
Peripherals & Subsystems	79.0	78.3
Leasing Companies	114.1	115.8
Composite Index	84.4	83.6
S&P 500 Index	118.3	117.3

Communications

Computer Systems

Software and DP Services

Semiconductors

Peripherals and Subsystems

Leasing Companies

CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOV. 2, 1988

EXCH		52-WEEK RANGE (1)	CLOSE NOV. 2 1988	WEEK NET CHNGE	WEEK PCT CHNGE
Q	SOFTWARE PUBG CORP	27 6	20.375	-3.5	-14.7
Q	STERLING SOFTWARE INC	9 6	7	0.3	3.7
Q	SUNGARD DATA SYS INC	20 10	16	-0.5	-3.0
Q	SYSTEMATICS INC	34 20	28.25	-1.0	-3.4
N	SYS. SOFT INC.	24 8	21.25	-0.5	-2.3
Q	VM SOFTWARE INC	18 7	15.75	0.0	0.0

Communications and Network Services

EXCH		RANGE	CLOSE	NET	PCT
N	AMERICAN INFO TECHS CORP	97 80	96.625	-0.4	-0.4
Q	ANDREW CORP	19 11	16.75	1.0	6.3
N	ARTEL COMM CORP	3 1	1.75	-0.3	-12.5
N	AT&T	31 24	28.75	1.4	5.0
Q	AVANT GARDE COMP INC	3 1	0.5	-0.3	-33.3
Q	AVANTEK INC	10 5	5	-0.3	-4.8
Q	AYDIN CORP	28 18	20.875	-0.3	-1.2
N	BELL ATLANTIC CORP	75 62	73	-0.4	-0.5
N	BELLSOUTH CORP	44 35	42	-0.1	-0.3
Q	COMPRESSION LABS INC	5 3	3.125	0.0	0.0
Q	COMPUTER NETWORK TECH	3 1	1.516	0.0	0.0
N	CONTEL CORP	39 27	38.25	-0.5	-1.3
Q	DATA SWITCH CORP	10 4	5.5	-0.3	-4.3
Q	DIGITAL COMM ASSOC	38 20	22.5	-0.3	-1.1
Q	DYNATECH CORP	24 18	20.75	0.0	0.0
Q	FIBRONIX INTERNATIONAL INC	2 1	3.75	0.3	7.1
Q	GANDALF TECHNOLOGIES	8 5	5.75	0.0	0.0
Q	GENERAL DATACOMM INDS	5 3	4.125	0.3	6.5
Q	GTE CORP	44 34	43.375	-0.9	-2.0
Q	INFOTRON SYS CORP	14 5	10.5	-0.5	-4.5
N	ITT CORP	55 42	52.5	-1.3	-2.3
A	M A COM INC	11 8	9.625	-0.3	-2.5
N	MCI COMMUNICATIONS CORP	16 7	15.625	0.0	0.0
Q	NETWORK EQUIPMENT TECH INC	23 13	15	-0.1	-0.8
N	NETWORK SYS CORP	12 7	10	-0.1	1.3
N	NORTHERN TELECOM LTD	20 15	17.625	-1.1	-6.0
Q	NOVELL INC	31 16	29.75	1.0	3.5
N	NYNEX CORP	72 61	67.25	0.4	0.6
Q	PACIFIC TELESIS GROUP	31 26	31.125	0.1	0.4
Q	PARADYNE CORP	6 4	5.5	0.0	0.0
A	PENRIL CORP	5 2	4.125	-0.4	-8.3
N	PLESSEY PLC	32 23	29.875	0.6	2.1
N	SCIENTIFIC ATLANTA INC	16 10	12.25	-0.5	-3.9
N	SOUTHWESTERN BELL CORP	42 33	41.375	-0.4	-0.9
Q	3 COM CORP	24 16	17.875	-1.1	-5.9
N	U S WEST INC	59 47	57.375	0.0	0.0

Computer Systems

EXCH		RANGE	CLOSE	NET	PCT
Q	ALLIANT COMPUTER SYS	9 3	4	0.1	3.2
Q	ALPHA MICROSYSTEMS	8 3	6	-0.5	-7.7
Q	ALTOS COMPUTER SYS	13 7	7.875	0.1	1.6
A	AMDAHL CORP	28 13	20.875	0.6	3.1
Q	APOLLO COMPUTER INC	17 8	8	-0.3	-3.0
N	APPLE COMPUTER INC	48 30	37.25	-2.0	-5.1
N	BOLT BERANEK & NEWMAN	19 13	12.75	-0.9	-6.4
N	BRITTON LEE INC	3 1	2.375	-0.1	-5.0
N	COMPAQ COMPUTER CORP	66 39	54.375	-1.4	-2.5
Q	COMPUTER AUTOMATION INC	6 4	4.375	0.1	2.9
A	COMPUTER CONSOLES INC	20 5	19.813	0.0	0.0
N	CONTROL DATA CORP DEL	31 18	19.375	-0.3	-1.3
Q	CONVERGENT TECH	7 3	6.438	0.1	1.0
N	CONVEX COMPUTER CORP	11 6	8.875	-0.4	-4.1
N	CRAY RESH INC	89 57	60.5	1.6	2.8
Q	DAISY SYS CORP	12 6	7.375	-0.1	-1.7
N	DATA GEN CORP	28 17	18.875	0.1	0.7
Q	DATAPOINT CORP	6 4	4.375	-0.1	-2.8
Q	DELL COMPUTER CORP	13 8	11.375	-0.5	-4.2
N	DIGITAL EQUIP CORP	145 86	95.5	1.9	2.0
N	FLOATING POINT SYS INC	5 3	2.75	0.3	10.0
N	GOULD INC	23 10	23.25	0.5	2.2
N	HARRIS CORP DEL	33 22	27.75	0.4	1.4
N	HEWLETT PACKARD CO	66 44	49.75	-0.4	-0.7
N	HONEYWELL INC	77 51	63	-1.8	-2.7
N	IBM	130 104	122.875	1.3	1.0
Q	INFORMATION INTL INC	16 9	13.75	-0.1	-0.9
Q	IPL SYS INC	5 1	4.625	0.3	5.7
Q	MAI BASIC FOUR INC	21 10	13.5	0.5	-8.0
Q	MATSUSHITA ELEC INDL LTD	330 139	175.5	-0.8	-0.5
Q	MEGADATA CORP	4 2	1.75	0.1	6.7
Q	MENTOR GRAPHICS CORP	37 16	27.5	-2.0	-6.8
Q	NBI INC	7 2	1.875	-0.1	-6.3
N	NCR CORP	70 53	57	-0.4	-0.7
N	PRIME COMPUTER INC	19 12	14.5	0.5	3.6
Q	PYRAMID TECHNOLOGY	16 5	15.25	0.3	1.7
Q	SILICON GRAPHICS CORP	25 12	16	0.3	1.6
Q	STRATUS COMPUTER	26 16	23.125	0.0	0.0
Q	SUN MICROSYSTEM INC	41 25	28.125	-0.9	-3.0
Q	SYMBOLICS INC	2 1	1.25	0.1	11.1
Q	SEQUENT COMPUTER SYS INC	19 11	16.625	-0.4	-2.2
N	TANDEM COMPUTERS INC	30 12	15.625	0.9	5.9
N	TANDY CORP	49 28	44.375	1.5	3.5
N	ULTIMATE CORP	24 9	10.25	0.4	3.8
N	UNISYS CORP	39 27	27	-1.4	-4.8
A	WANG LABS INC	17 8	8.375	-0.5	-5.6

Software & DP Services

EXCH		RANGE	CLOSE	NET	PCT
Q	ADVANCED COMP TECH	4 1	1.688	0.1	3.9
Q	AMERICAN MGMT SYS INC	19 9	15.5	0.8	5.1
Q	AMERICAN SOFTWARE INC	16 7	14.125	-0.6	-4.2
N	ANACOMP INC	12 5	8.25	-1.0	-10.8
Q	ANALYSTS INTL CORP	10 6	10	0.1	1.3
Q	ASHTON TATE	31 15	24.75	-1.4	-5.2
Q	ASK COMPUTER SYS INC	16 6	13.5	-0.5	-3.6
Q	AUTODESK INC	31 15	44.25	-0.6	-2.5
N	AUTO DATA PROCESSING	47 35	37.625	0.9	2.4
Q	BOOLE & BABBAGE INC	10 6	9.75	0.3	2.6
N	BUSINESSLAND INC	15 7	12.875	-1.1	-8.0
N	COMPUTER ASSOC INTL INC	33 22	28.5	-1.3	-4.2
Q	COMPUTER HORIZONS CORP	12 7	9	0.1	1.4
N	COMPUTER SCIENCES CORP	56 38	46.875	-1.1	-2.3
Q	CORPORATE SOFTWARE	15 6	9.625	0.1	1.3
N	COMPUTER TASK GROUP INC	17 9	15.75	0.0	0.0
Q	COGNOS INC.	8 4	7.125	-0.3	-3.4
Q	COMSHARE INC	25 13	19	-0.3	-1.3
N	CULLINET SOFTWARE INC	9 4	5.5	-0.4	-6.4
Q	DUQUESNE SYS INC	22 13	18.5	0.0	0.0
Q	GENERAL MTRS (CLS E)	46 30	41.5	0.5	1.2
N	HOGAN SYS INC	7 3	4.875	-0.6	-11.4
Q	INFORMIX CORP	26 7	7.625	-1.0	-11.6
Q	INTELLICORP INC	4 2	3.125	-0.1	-3.8
Q	KEANE INC	16 8	14.875	0.0	0.0
N	LOTUS DEV CORP	34 15	17.25	-0.3	-1.4
Q	MANAGEMENT SCI AMER	14 6	7.25	-0.1	-1.7
N	MICRO PRO INTL CORP	5 2	2.563	0.0	0.0
Q	MICROSOFT CORP	71 40	47.25	-2.5	-5.0
Q	MORINO ASSOCIATES INC	20 10	16.25	0.3	1.6
N	NATIONAL DATA CORP	32 20	22.75	-0.3	-1.1
N	ON LINE SOFTWARE INTL INC	14 4	5.75	0.0	0.0
Q	ORACLE SYS CORP	22 10	15.25	-0.8	-4.7
Q	PANSOPHIC SYS INC	19 12	14.125	-0.5	-3.4
Q	PHOENIX TECHNOLOGIES INC	18 13	13.5	-1.0	-6.9
Q	POLICY MGMT SYS CORP	26 17	25.25	1.6	6.9
Q	PROGRAMMING & SYS INC	15 7	14.5	0.5	3.6
Q	RABBIT SOFTWARE INC	3 2	2.875	0.1	4.5
Q	RELATIONAL TECHNOLOGY INC	21 12	12.125	-1.3	-9.3
Q	REYNOLDS & REYNOLDS CO	24 14	22	-0.5	-2.2
Q	SEI CORP	22 12	17.5	0.3	1.4
Q	SHARED MED SYS CORP	27 14	16	-1.3	-7.2
Q	SAGE SOFTWARE INC.	8 5	7	0.0	0.0

Semiconductors

EXCH		RANGE	CLOSE	NET	PCT
N	ADV MICRO DEVICES INC	17 8	8.5	-0.5	-5.6
N	ANALOG DEVICES INC	16 8	10.875	-0.4	-3.3
Q	ANALOGIC CORP	8 5	7.25	-0.4	-4.9
Q	CHIPS & TECHNOLOGIES INC	21 6	12.25	0.5	4.3
N	INTEL CORP	37 20	24.75	-1.3	-4.8
Q	LSI LOGIC CORP	14 7	9.25	0.1	1.4
N	MOTOROLA INC	55 36	38.25	-1.3	-3.2
N	NATL SEMICONDUCTOR	15 8	9.25	-0.8	-7.5
N	TEXAS INSTRS INC	60 37	38	-0.6	-1.6
N	WESTERN DIGITAL CORP	18 11	12.375	0.0	0.0

Peripherals

EXCH		RANGE	CLOSE	NET	PCT
Q	ALLOY COMP.	7 2	2.875	-0.5	-14.8
N	AM INTL INC	6 3	4.875	-0.3	-4.9
Q	AST RESH INC	17 6	7.75	-0.4	-4.6
Q	AUTO TROL TECH CORP	6 3	4.875	0.1	2.6
N	BANCTEC INC	12 5	10.375	-0.1	-1.2
Q	CIPHER DATA PRODS INC	10 5	9	-0.3	-2.7
Q	COGNITRONICS CORP	4 2	2.75	-0.3	-8.3
Q	CONNOR PERIPHERALS	10 7	7.375	0.1	1.7
A	DATAPRODUCTS CORP	13 7	11.75	0.0	0.0
A	DATARAM CORP	9 5	7.75	-0.1	-1.6
N	EASTMAN KODAK CO	56 39	46.125	-2.5	-5.1
Q	E M C CORP MASS	19 4	4.75	0.8	18.8
N	EMULEX CORP	11 4	9.625	-0.4	-3.8
Q	EVANS & SUTHERLAND	25 13	14.5	0.5	3.6
Q	ICOT CORP	5 3	2.75	-0.3	-8.3
Q	INTERLEAF INC	21 7	7.25	-0.8	-9.4
N	KOMEGA CORP	5 1	3.563	0.0	0.0
Q	LEE DATA CORP	4 3	3.375	-0.6	-15.6
Q	MASSTOR SYS CORP	3 1	2.313	0.1	2.8
Q	MAXTOR CORP	16 6	7.25	0.4	5.5
Q	MICROPOLIS CORP	30 6	6.625	-1.0	-13.1
Q	MINISCRIBE CORP	14 5	8.125	-0.3	-3.0
Q	MINNESOTA MNG & MFG CO	68 55	60.5	-2.1	-3.4
N	MSI DATA CORP	24 9	23.75	0.0	0.0
Q	PERSONAL COMPUTER PRODUCTS INC.	7 4	5.063	0.0	0.0
Q	PRIAM CORP	3 1	1.375	-0.1	-4.4
Q	PRINTRONIX INC	11 7	8.75	0.1	1.4
Q	QMS INC	15 7	7.125	0.1	1.8
N	QUANTUM CORP	14 9	13.625	-0.1	-0.9
Q	RECOGNITION EQUIP INC	11 6	7.75	0.8	10.7
N	REXON INC	9 4	7.625	-0.1	-1.6
Q	SEAGATE TECHNOLOGY	23 7	7.625	0.0	0.0
Q	STORAGE TECH CORP	4 1	1.5	-0.1	-7.7
N	TANDON CORP	3 1	1.375	-0.1	-8.3
N	TEC INC	6 3	2.875	0.0	0.0
N	TEKTRONIX INC	34 20	21.75	0.6	3.0
N	TELEVIDEO SYS INC	2 1	0.625	0.1	25.0
N	XEROX CORP	63 50	59	-1.3	-2.1

Leasing Companies

EXCH		RANGE	CLOSE	NET	PCT
Q	AMPLICON INC	18 7	16.75	-0.3	-1.5
N	CAPITAL ASSOCIATES INTER-NATIONAL INC	7 4	6.5	-0.1	-1.9
Q	COMDISCO INC	25 15	22	0.3	1.1
N	CONTINENTAL INFO SYS	9 4	3.75	-0.3	-6.3
Q	LDI CORPORATION	14 9	13.5	0.0	0.0
Q	PHOENIX AMERIN INC	4 2	3.375	0.3	8.0
Q	SELECTERM INC	6 3	4.875	0.4	8.3

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL

Laughingstock

Instability of market fueled by takeover rumors, Quayle's tales

Market ups and downs sparked by more takeover rumors, a vigorously denied mid-week report that Dan Quayle took his bar exam by proxy and upbeat expectations of the October unemployment report were reflected in technology stock performance last week.

A moderate surge among blue chips failed to benefit IBM; it climbed 3¼ points to a mid-week high of 124 but dropped back to close on Thursday at 122¼, up 1½ points from the week's start. Digital Equipment Corp. held on to last week's dramatic rebound, adding ⅞ of a point to close Thursday at 95.

A general late-week rally in over-the-counter issues did little to benefit the technical sector. Apple Computer, Inc. rose slightly early in the week but dropped back to close down 1⅛ points at 37⅜; Microsoft Corp. fell even further, from 49½ at the start of the week, down 2¼ points to close at 47¼.

Intel Corp. inched back up from its late-October 2¾-point slide to close Thursday at 25, up ⅛ of a point for the week. Similarly, usually high-flying Oracle Corp. ended Thursday at 16, up ⅞ of a point from the previous 15⅛.

NELL MARGOLIS

Campaign

FROM PAGE 1

vice-president of Below, Tobe & Associates, Inc., a Los Angeles-based firm providing computer-aided campaign services to 16 state Democratic Party organizations as well as Massachusetts Gov. Michael S. Dukakis' campaign. "Everyone still does what they did, only a lot more and a lot faster."

'Computer-illiterates'

Several fundamental factors militate against a major role for computers in a presidential campaign. "Campaigns are mostly made up of people who are computer-illiterate, so we've got to devise a setup that a computer-illiterate can use," said Michael Thompson, who oversees computer support at Vice-President George Bush's headquarters in Washington, D.C.

Thomas B. Hofeller, director of computer services at Republican National Committee headquarters in Washington, added another argument for keeping campaign operations lean: "One of the things you have in politics is a very dynamic situation — lots of turnover."

At Bush headquarters, two blocks from the White House, more than 400 campaign workers adhere to the keep-it-simple principle; there is no humming mainframe, no overloaded network, no hint of technological sophistication.

Instead, nearly 100 assorted stand-alone personal computers — many of them leased — streamline mundane office chores such as word processing and spreadsheet tabulation. On the road, staffers draft speeches and write reports with a pair of IBM portables.

"We want just enough to get by," Thompson said. "A main-

frame or network would add unneeded complexity to an already hectic situation. We'd run someone to death just trying to stomp out fires."

Additionally, it does not make economic sense to pour money and technological know-how into something that dies so quickly; the Federal Election Commission dictates that each candidate's headquarters be dismantled within 30 days after the election.

A minor concern

Even at Republican National Committee headquarters — where an MIS shop almost 30 strong oversees a large Wang Laboratories, Inc. VS 100-based automated office, a Digital Equipment Corp. Vaxcluster-based voter list and a targeting and analysis project that never folds (it's always election season somewhere) — cutting-edge technology is not a high priority. "Almost every problem I've encountered in computer-land turned out to be a management problem, not a technical problem," Hofeller said.

The Dukakis camp arrived at the Democratic National Convention in July sporting a DEC Microvax II, 12 terminals, six networked Apple Computer, Inc. Macintosh computers and an array of application and development tools that have remained with the campaign.

Staffers said the machines handle mostly drudge work, thus freeing volunteers to make phone calls or get out and talk to voters.

Dukakis' public relations engine is also fueled by Proviz, an imagizer from Pixelogic, Inc. in Woburn, Mass., that allows campaign workers to quickly exploit photo opportunities by recording and digitizing photographs on diskettes and then loading the images into the Macintosh,

where they can be quickly printed out.

In this way, Dukakis could be shaking hands with the mayor of San Antonio at noon — and the press would have a release and an accompanying photo by 1 o'clock.

There are, however, instances in which computer-engendered additions have triggered less cosmetic and more qualitative change in a high-power political campaign. The "mere speed" advantage loses its "mere" in situations like the

one recently confronted by Indiana Democratic gubernatorial candidate Evan Bayh.

"Some of our issues people have our opponent's contribution records up on a computer, where they're able to analyze them for all kinds of patterns and trends," said Fred Nation, Bayh's press secretary. One Friday, in the last weeks of the campaign, "about 1,000 pages of records of contributions to our opponent's campaign came in."

The deluge was timely, Nation said, because Bayh was

about to be challenged on a contribution issue. Only through the use of an on-line analysis could the Bayh team sort through the voluminous information quickly enough to make a preemptive strike at a Saturday afternoon press conference.
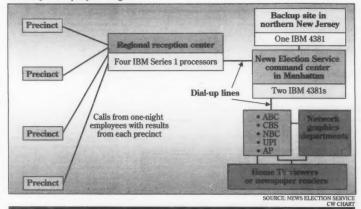
On the record

Back in Washington, the Republican National Committee jogs its memory with Quotes, an on-line database running on a VAX and housing approximately

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Counting the votes

More than 100,000 "one-night employees" of the News Election Service start a ball rolling that eventually winds up in your living room

SOURCE: NEWS ELECTION SERVICE
CW CHART

Dewey will never defeat Truman again

It seems so easy. Tom Brokaw rustles through scattered papers, eyeballs them quickly and then raises his eyes toward the camera as he solemnly states whether Bush or Dukakis will be receiving mail at 1600 Pennsylvania Ave. next year.

But between the time you pull that curtain behind you in the voting booth tomorrow and the moment you hear the final national results, more than 100,000 people will have worked back-breaking hours to deliver the statement it took Brokaw — or Peter Jennings or Dan Rather — only seconds to read.

At the eye of the media's vote-gathering hurricane is the Manhattan-based News Election Service (NES). This joint service of the ABC, CBS and NBC television networks and the Associated Press and United Press International is charged with counting the votes.

"We're the world's largest notebook," said Nick Acocella, director of operations at NES. "We don't interpret, analyze, predict or project. All we do is report raw data and feed it to the companies."

NES' findings are also available to other media organizations for a fee, with the price of each state established according to size. "Obviously, it's cheaper if you want to buy Delaware than if you want to buy Illinois," Acocella said.

NES begins its mammoth one-night task soon after the smoke clears on the last election day. Acocella must amass a 100,000-soldier army by election night in order to ensure that each voting district in the country is covered. Civic and community groups like the League of Women Voters often trade hundreds of volun-

teers for a contribution to their organization.

On election night, the reporters fan out — normally one per voting district — and wait for the votes to be counted. This process, too, promises future streamlining: Nixdorf Computer Corp. recently introduced a computerized voting machine using touch-screen technology, which could slice counting time considerably.

Once the numbers for the presidential, Senate and gubernatorial races are scribbled down, the reporter phones a regional telephone reception center in Dallas, Chicago or Cincinnati.

Operators at the reception center work at an IBM 3151 or 3161 terminal, feeding the numbers into one of four IBM Series 1 processors. These figures are in turn relayed to NES' Manhattan offices, where they are entered into two IBM 4381s. A backup 4381 in northern New Jersey provides emergency service.
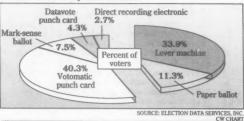
Although the NES tallies are the bedrock database for the major media organizations, they are not the sole source. Most of the networks also rely on exit polling for quick-and-dirty indications.

Finally, before the numbers are broadcast, they are fed through a network computer, which integrates them with appropriate animation elements. NBC, for example, uses Cypher, a character-driven display device produced by Quantel Ltd. that projects graphic elements alongside on-screen newscasters. For months preceding the election, the network's graphic artists used Quantel's Paintbox to produce the various graphic elements that will be seen on home televisions.

JAMES DALY

Clear majority

More than half of all voters cast ballots on computerized voting machines rather than by manual methods

SOURCE: ELECTION DATA SERVICES, INC.
CW CHART

High-tech a non-issue in '88

In a campaign in which sound bite makes right, bytes have gotten short shrift from both Michael Dukakis and George Bush; the candidates apparently find the issue too complex to express succinctly to the electorate.

BY MITCH BETTS
CW STAFF

Tomorrow, citizens will select a president to guide the U.S. through the next four years of the information age. But many in the computer community are disappointed that the 1988 campaign has featured more talk about prison furloughs and the Pledge of Allegiance than about technology and competitiveness.

IBM Chairman John F. Akers expressed his frustration back in May, when he said: "Let's get out of trivial pursuits and into the key questions of national competitiveness and survival."

A. G. W. "Jack" Biddle, president of the Computer & Communications Industry Association, is another executive disappointed by the nearly issue-less campaigns run by Michael Dukakis and George Bush.

"Whichever candidate wins, it's evident that the high-technology industry has a major task of educating the new administration as to the vital role that technology plays in our economic well-being and national security," Biddle said.

Neglected issues

It's not as though there are no technology issues to discuss. Biddle, Akers and other executives cited the following points:
- Various studies report that the U.S. is in danger of losing the technology race with Japan in key areas such as superconductors, fiber optics and supercomputers.
- Biddle noted that U.S. commercial research and development expenditures — as a percentage of gross national product — lag behind the R&D expenditures of Japan, West Germany and France.
- Since 1972, Japan's manufacturing productivity index has increased eight times faster than the same U.S. index, and West Germany's productivity index has grown three times faster, according to the Council on Competitiveness.

Flip a coin

Computerworld editorial declines to endorse either candidate — but lays out information issues ignored in the campaign. Page 20.

- Akers, in his May speech, lamented that 60% of U.S. high school graduates are unprepared for entry-level jobs and that 13% of all adults here are illiterate.

The reason these issues got little discussion is that "the intellectually honest approach to the competitiveness issue is too complicated to fit in a [television] commercial or sound bite," former congressman Ed Zschau said. Zschau is now chairman and

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mention of computer technology in the Republican or Democratic Party platforms, nor in the presidential debates. The word "automation" never showed up in the campaign at all.

The good news is that experts believe both Bush and Dukakis are favorably disposed toward the high-tech industry's agenda. "We would have rather had these things addressed frontally and debated in the campaign, but we still think that both candidates are going to be receptive to working with us," Kay said.

For example, the candidates' position papers show that both Bush and Dukakis support a permanent extension of the business R&D tax credit, improvements in science education and

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Advice for the next president

When business economists ranked economic policies in order of priority, reducing the federal budget deficit came out on top

1. Reduce budget deficit
2. Enter into free-trade agreement with Canada
3. Speed up productivity growth
4. Boost personal savings
5. Stimulate business investment
6. Pursue General Agreement on Tariffs and Trade negotiations
7. Permit bank entry into other financial industries
8. Reform securities trading to prevent another market crash
9. Increase antitrust enforcement
10. Discourage corporate debt accumulation
11. Curb hostile takeovers

SOURCE: NATIONAL ASSOCIATION OF BUSINESS ECONOMISTS
CW CHART

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chief executive officer of Censtor Corp., a computer peripherals company in Silicon Valley.

Indeed, government support for a robust computer industry and economy involves a host of complex and interrelated trade, tax, budget, research and education policies. "I assume the candidates felt that they were too difficult to explain and didn't advance their campaign themes," said Kenneth R. Kay, executive director of the Council on Research and Technology.

A review of campaign documents, transcripts and press reports confirms that there was no

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computer literacy and a crackdown on white-collar crime.

Bush also supports cutting the capital gains tax rate to 15% on investments held for at least one year — a proposal supported by the National Venture Capital Association and the small high-tech firms in the American Electronics Association. Dukakis and other opponents said the proposal would be a tax break for the wealthy, lose revenues and upset the Tax Reform Act of 1986.

In the telecommunications field, Dukakis is likely to have a pragmatic approach to regula-

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Who's in, who's out

Who will make the decisions about tax, trade, telecommunications and economic policy in the next four years? The presidential candidates' advisers on technology issues are presented here, along with speculation about possible candidates for Cabinet posts.

The listing is based on *Computerworld* research and reports by *National Journal*, a political magazine.

BUSH ADMINISTRATION

- **Telecommunications advisers:** Dean Burch, director general of Intelsat and former Federal Communications Commission chairman (1969-1974); Richard Wiley, attorney and former FCC chairman (1974-1977). They will help select FCC nominees.
- **Secretary of Commerce:** Carroll Campbell, governor of South Carolina; Robert Mosbacher, a Houston oilman; Elizabeth Dole, former transportation secretary (1983-1987); Maurice (Hank) Greenberg, an insurance executive and trade adviser; Pierre (Pete) du Pont, former governor of Delaware (1977-1985); U.S. Rep. Jack Kemp (R-N.Y.); Edmund Pratt, chairman of Pfizer, Inc. and former controller at IBM World Trade Corp. (1957-1962); Clayton Yeutter, U.S. trade representative.
- **U.S. Trade Representative:** Bruce Smart, former undersecretary of commerce (1985-1988); Lamar Alexander, former governor of Tennessee (1979-1987); Hank Greenberg; Robert Mosbacher.
- **Attorney General:** Richard Thornburgh, incumbent.
- **Secretary of the Treasury:** Nicholas Brady, incumbent.
- **Secretary of Defense:** Frank Carlucci, incumbent; John Tower, former U.S. senator from Texas (1961-1985).
- **Chairman, Council of Economic Advisers:** Michael (Barry) Boskin of Stanford University.

DUKAKIS ADMINISTRATION

- **Telecommunications advisers:** U.S. Rep. Edward Markey (D-Mass.), chairman of the House telecommunications subcommittee; Charles Ferris, attorney and former Federal Communications Commission chairman (1977-1981); Hank Keohane, a Boston public utilities lawyer. They will help select FCC nominees.
- **Secretary of Commerce:** A well-regarded business executive close to Dukakis, such as Don Gevritz, chairman of the Foothills Group (a venture capital firm in Los Angeles) or Joe M. Henson, former president of Prime Computer, Inc.
- **U.S. Trade Representative:** Stuart Eizenstat, lobbyist for the Council on Research and Technology, better known as Coretech, and former White House policy adviser (1977-1981).
- **Attorney General:** U.S. Sen. Paul Sarbanes (D-Md.).
- **Secretary of the Treasury:** Roger Altman, vice-chairman of the Blackstone Group (an investment banking firm) and former assistant treasury secretary (1977-1980).
- **Secretary of Defense:** Bobby Inman, chief executive of Westmark Systems, Inc., former president of Microelectronics & Computer Technology Corp. (1983-1986) and former director of the National Security Agency (1971-1981); William Perry, president of Hambrecht & Quist Technology Partners, Inc. and former undersecretary of defense (1977-1981).
- **Chairman, Council of Economic Advisers:** Lawrence Summers of Harvard University.

MITCH BETTS

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tion, while Bush is likely to support continued but moderate deregulation of the industry, commented Page Montgomery, vice-president of Economics and Technology, Inc., a Boston-based telecommunications research and consulting firm.

AT&T has the most at stake in the presidential election, according to George R. Dellinger, a telecommunications analyst at Washington Analysis Corp. If Dukakis wins, the Federal Communications Commission's plan to remove profit ceilings on AT&T's long-distance unit could be delayed until 1990 or later

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and the "price cap" plan could be changed to reduce the benefits to AT&T, Dellinger reported.

If Bush wins as predicted, the price cap regulations will be approved more quickly and with fewer changes, Dellinger predicted.

Aside from the position papers, a few computer industry issues did get a brief airing in the campaign from mid-September to mid-October. Dukakis and running mate Sen. Lloyd Bentsen (D.-Texas) began hitting a theme of economic nationalism, including an aggressive trade

Presentation Manager ships

But dearth of applications, pricey upgrade stifles user enthusiasm

BY DOUGLAS BARNEY
CW STAFF

If user apathy is any indication, IBM and Microsoft Corp. need not have bothered to ship OS/2 Presentation Manager by its Halloween deadline. Too few device drivers, zero applications and the huge cost of upgrading will keep the software off most personal computers for years to come.

Even those committed to graphical user interfaces are holding back on Presentation Manager. The fact that users need a high-end Intel Corp. 80286 or 80386 processor, a mouse, a hard disk, high-resolution graphics, new software and approximately 5M bytes of random-access memory has more than a little to do with it, users said last week.

Computer managers said they will have trouble justifying the added cost of running the Presentation Manager, which is based largely on Microsoft Windows, an interface that works on top of the firm's MS-DOS. Unless RAM prices fall dramatically, the PC market will remain dominated by MS-DOS and Apple Computer, Inc. Macintosh operating systems, users said.

In an interview after the press briefing last week announcing the shipment of Presentation Manager, IBM Entry Systems Division President William Lowe argued that an IBM Personal System/2 Model 70, readied to run Presentation Manager, is no more expensive than IBM's Personal Computer AT 339, bought a year or two ago and fully equipped to run PC-DOS.

Skeptical

That argument did not go over well with users. "The introduction [to end users] will be a challenge because of the huge memory requirement," said Gordon Sollars, vice-president of Merrill Lynch & Co. "You can't run with less than 5M bytes," Sollars explained, referring to the memory needed for multitasking.

Steve Ballmer, Microsoft's vice-president of systems software, claimed that users need only 2M to 2.5M bytes to get up and running. But Micro Data Base Systems, Inc.'s Object/1 for Presentation Manager will itself require 4M bytes of RAM when it ships next year.

New machines prepped for Presentation Manager could cost five digits, and upgrading existing machines could run into thousands, users said. Merrill Lynch's Sollars would have to spend some $2,000 to add an extra 4M bytes to his firm's PC ATs and would have to buy new applications to make the move. "You are spending half again as much as you spent on the workstation when you bought it," he said.

Hidden requirements

Sollars said he is still not sure this configuration would provide adequate performance. Some users and analysts said they believe a high-speed 386-based machine is required to keep multiple tasks from turning the machine into a sloth.

The complete lack of applications software will also hinder Presentation Manager implementation. "I have a feeling that it will be two to five years before the applications are available," said Jim Wilt, information center technical specialist at a large Midwestern aerospace firm.

Despite user skepticism, Microsoft officials argued that many software firms are putting more than half their development resources into the Presentation Manager. Wordperfect Corp. is working "furiously" on applications, the officials said, and hopes to have a product available late next year.

Micrografx, Inc., a leading Windows developer, reportedly expects to ship Presentation Manager applications early next year. However, no timetables were given for major applications such as Lotus Development Corp.'s 1-2-3 and Ashton-Tate Corp.'s Dbase.

Waste of time?

According to one user, vendors may be wasting their time writing Presentation Manager applications. "After a year of working on the applications, the vendors will wonder where the customers are," said Jim Stoddard, vice-president of strategic systems at Fidelity Investments, which uses Microsoft Windows on workstations.

Another roadblock is the lack of device drivers that enable the software to do essential tasks such as appearing on-screen and printing. Today's Presentation Manager contains only a sprinkling of device drivers and is therefore virtually unusable on many systems. Microsoft has promised an update early next year that will provide a broader range of drivers.

One user, defying the critics, said he is champing at the bit. "We'd be ready to move to it tomorrow if there was a suite of software that would run under it," said Arthur Block, a vice-president at Manufacturers Hanover Trust.

Block said his firm will begin the migration next March and that by June the firm will have some 1,500 workstations running Presentation Manager. These machines will be running custom applications based on Microsoft's Excel integrated spreadsheet, a product already demonstrated under the Presentation Manager.

Campaign

110,000 quotes by and about leading candidates. "If Dukakis opens his mouth on any issue," Hofeller said, "we can have a look at anything he's said on that issue within minutes and go from there."

Perhaps this campaign's most noticeable computer-related addition is the way in which machines have added fleet-footed efficiency to an age-old linchpin of campaigning: targeting voters.

Below, Tobe & Associates, for example, uses an IBM 4381 to compile voter databases for its clients. Information on voters — including party affiliation, date of birth, gender, race and how frequently they have voted in the past few elections — arrives daily in whatever form municipal election boards supply.

The firm adds ethnic identifiers and telephone numbers and sorts the voters into households using records collected from sources such as veterans' associations and the Department of the Census.

Additionally, the often daunting and man-hour-burning input task has been significantly aided by the use of handheld computer "wands." The wands read bar codes from coded telephone lists into a PC that uploads — or into a phone that transmits — the information to the 4381.

Once loaded, the mainframe's analysis software goes to work. The result: a degree of personalization in mail and phone calls from a candidate unheard of in past elections.

"We can ask the computer anything, from 'Give me all the Democrats in Illinois' to 'Give me all the Reagan Democrats in Illinois' to 'Give me all the right-on black Jewish Democrats who speak Spanish,' " said Frank Tobe, president of Below Tobe.

Still, in the final analysis, politics remains a particularly personal endeavor. "It's like a bakery that gets some kind of incredible dough-beating machine," said Pamela Lowry, head of computer operations for the Dukakis campaign. "Suddenly, you can turn out 20 loaves for every one you've been baking. You can do a lot more a lot faster, but you still need a good recipe, good ingredients. When all is said and done, you're still a bakery."

Non-issue

policy, proposals for education, research and technology programs and criticism of foreign ownership of U.S. companies.

The series of attacks and Bush counterattacks began Sept. 22 at the Intel Corp. plant in Santa Clara, Calif., where Bentsen blasted the Reagan-Bush administration's trade policy. "This administration talks tough on national defense . . . but their do-nothing trade policy has left us dependent on Japan for 40% of the computer chips used in our own weaponry," he said.

Bentsen said the administration turned its back while semiconductor makers were "devastated by unfair competition."

Dukakis followed up by expressing concern about a rise in foreign ownership of businesses and plants in the U.S. and proposing that import-battered industries get some protection while they adopt new technologies. He also vowed to end the U.S. trade deficit in three years.

'A little surprised'

Bush, responding in a Seattle speech, suggested that the Democrat was using "fear of foreigners" to gain attention for his struggling campaign. "Frankly, I'm a little surprised at my opponent's recent turn to protectionist demagoguery," Bush said. "I don't think he really believes it."

Criticizing the Dukakis assault on foreign ownership, Bush said foreign investment in the U.S. helps create domestic jobs.

Despite the Democrat's high-tech pitch, industry executives overwhelmingly support Bush and the Republican Party's pro-business attitudes. An April poll of the chief executives at 100 computer firms showed that Bush had the support of 80%, compared with 18% for Dukakis and 2% undecided.

The results coincided almost exactly with the political affiliation of the executives — 81% Republicans and 18% Democrats. Dukakis has a pocket of support in Massachusetts, where his allies include An Wang, CEO of Wang Laboratories, Inc., Joe M. Henson, former president of Prime Computer, Inc., John J. Cullinane, chairman of Cullinet Software, Inc., and Mitch Kapor, founder of Lotus Development Corp.

The poll, conducted by the Gallup Organization, Inc. for *Computer Systems News*, showed that the computer industry believes Republicans are better at handling U.S. trade and budget issues.

Dukakis and the Democrats "don't understand how economic progress is made," said Roger W. Johnson, chairman and president of Western Digital Corp., a semiconductor company in Irvine, Calif.

For example, he said, Dukakis is more likely to pursue protectionist trade policies and continues to "scream at people for moving jobs offshore" despite the fact that such moves serve to make U.S. firms more competitive.

Bush is a comfortable choice for the business community, Zschau added. "People in business at this stage do not want fundamental change" in the direction of government policies, he said.

Patricia Faherty, Computerworld editorial assistant, assisted with research for this article.

Democrats' deep pockets

The Washington Post obtained a list of big contributors to the Democratic National Committee's "soft money" account for presidential contender Michael Dukakis, it was disclosed last week. On the list were Thomas J. Watson, IBM's chairman-emeritus ($50,000); Lotus Development Corp. and On Technology Co. founder Mitchell Kapor ($100,000); An Wang, Wang Laboratories founder ($90,000); and *Computerworld* founder Patrick McGovern, chairman of International Data Group ($80,000). Also interesting is the fact that Sheldon Adelson, CEO of the Interface Group, Inc., gave big bucks to both parties: $100,000 for Republican George Bush and $80,000 for Dukakis. Federal law prohibits individual contributions to candidates of more than $1,000; bigger gifts are distributed to state party organizations to benefit complete slates of candidates, thus skirting the federal limit.

MITCH BETTS

Anatomy of a virus

The virus that has caused hundreds of research institutions to shut down their computers appears to be the work of an extraordinarily capable computer programmer.

The virus — estimated to be some 50,000 lines of executable code — acts more like a worm, rapidly moving from one program to another while replicating itself without the need for human interaction. In comparison, most viruses attach themselves to a program, which this particular bug does not seem to do.

Thus far, what is known is that the virus works by rummaging through a computer's files and attempting to identify user names and programs, especially automated logon procedures. It compiles a list of possible passwords and then attempts to find out to which network the computer is linked.

The program then comes up with a list of machines that may be vulnerable to attack and infection. Then it simply grinds away at every possible combination until it penetrates the system.

The tricky part of the virus is its multipronged attack.

"The thing that makes this little beastie so nasty is how it works in two separate areas," said Jeff Schiller, manager of networks at MIT.

Garbage in . . .
On one end, the virus enters the targeted machine through a debug feature in a widely used mailer program on Internet called Sendmail, a function that was originally used to clean out early bugs in the network. The virus shuts off the system's security and copies a short program from the host machine to the targeted machine.

The program compiles and runs and then turns to pull over binary and command files from the machine on which it was readied.

A second component of the virus makes use of a bug in the network facility in Unix to launch what David Clark, chairman of the Internet Activities Board and a senior scientist at MIT, called an "extraordinarily esoteric attack." While the virus does not result in malicious damage of files or data, it begins using up memory and storage space, slowing down the machine.

MICHAEL ALEXANDER

Virus

ington, D.C.

The Computer Fraud and Abuse Act of 1986 outlaws unauthorized access and tampering with federal computer systems and gives the Secret Service and the Federal Bureau of Investigation joint jurisdiction over investigations. Adams said Friday afternoon that the two agencies did not have a formal investigation under way.

Reports from around the country indicated that the virus was prevalent on VAXs and Sun workstations. "We heard from some of our customers, and we're working with them," a Sun spokeswoman said Friday.

DEC officials said the virus is not infiltrating any of its systems at DEC facilities and that no customers have yet notified DEC of an infection. A spokesman said DEC's Ultrix does not compiled with the Unix debug facility include the Send.mail command that the virus uses to spread.

West Coast sources said the program works only on systems running the University of California at Berkeley's Unix 4.3 in the Send.mail program; Version 4.2, the sources said, would respond to the program's command but would crash rather than executing its directions. Cole said it has been generally known that Send.mail had this hole but that "no one thought it was important."

Internet encompasses five computer centers and 12 regional nodes consisting of an estimated 250,000 computers in federal agencies, universities, research laboratories and firms working on government contracts.

Although no formal investigation was known to be under way Friday, the situation "certainly has gotten the attention of this town," said the computer security chief at one Cabinet department in Washington, D.C., who asked for anonymity. At the U.S. Department of State, "we consider it a major problem. We take it very seriously," said Thomas Nightengale, information systems security officer at the U.S. Department of State, which was not affected by the virus.

The network is used by researchers to transmit programs, data and information by electronic mail. The virus was automatically passed along in a bucket-brigade-like fashion, from one computer to another, Hall explained. While the virus did not destroy data on the computer network, hundreds of computers on the network had to be pulled off-line so the virus could be cleansed from the system.

The three primary networks within Internet are Arpanet, or Advanced Research Projects Agency Network, which connects military and civilian computers; Military Network (Milnet), which is reserved for military, though not highly classified, communications; and National Science Foundation Network, or NSFnet, which links universities, research labs and other institutions.

John Porter, associate provost for information technology at Boston University, said the same network that induced the renegade program also brought forth a cure. "Somewhere about the same time that the virus hit us, the fix also came in — a message telling us what we should do in order to make us immune to it," he said. That fix, he said, came from someone who disassembled the code "and figured out what it did and what route it used to bypass security and how to patch systems so that route was cut off."

Various opinions were expressed about the origin of the program, with *The New York Times* claiming Friday that an anonymous caller claimed it resulted from a graduate student's viral program experiment that went out of control. Darren Griffith, a computer scientist at Lawrence Berkeley Laboratories, another impacted site, expressed doubt about that report: "It could have been, but when it has this many transport mechanisms, I doubt it."

Wednesday's fiasco highlights the need for a secure, nationwide network for researchers and points up the need for a national policy, said Mike Roberts, vice-president of networking at Educom, a consortium of 550 university members that explores issues related to information technology.

Staff members James Daly, J. A. Savage and Mitch Betts contributed to this story.

MIS reacts

At least one corporate MIS group went into immediate action following last week's virus attack, but MIS executives, who largely use private networks, generally limited their actions to renewed warnings to users.

Polaroid Corp. in Cambridge, Mass., told users to minimize their exposure to the virus by temporarily avoiding use of databases established by neighbor and virus victim MIT.

"We always insisted that our people don't replicate software or otherwise violate copyright laws," said Al Hyland, director of worldwide systems at Polaroid.

In general, MIS executives reacted to the viral threat by focusing on administrative actions.

"You can take reasonable and prudent controls and care, and after that you cross your fingers," said Jeff Harris, director of information technology at the Mattel Toys division of Mattel, Inc. in Hawthorne, Calif.

At Ball Aerospace in Boulder, Colo., director of information systems Angelo Privetera said he expects no policy changes. "Our company has taken action over the past couple of years. We know that there is no cure. Prevention is the only cure," he said.

Carl Conger, manager of client services at Texas Utilities Co. in Dallas, said, "Most of our corporate communications is on leased lines."

JAMES CONNOLLY

Where were you when . . .

Virus attacks were reported at the following organizations:

Lawrence Livermore Laboratories, California. An employee logged on to the system at about 10:00 p.m. from home. He called computer security manager Chuck Cole at about 11:30. Cole assembled a five-member team and arrived at the lab at 12:30 a.m.: "By 1:30, we decided it was serious enough to sever the network." The system went back up Friday morning at 9:00 a.m. after the team installed a patch.

Lawrence Berkeley Laboratories, California. The virus was detected at 10:00 p.m. Wednesday night. Berkeley shut down immediately. It took a couple of hours to purge the two Sun computers that the virus had entered, one of which was running a particle accelerator. When brought back up, the machine was reinfected within 30 seconds.

Harvard University, Massachusetts. According to computer security specialist Cliff Stoll, the worm was through all of Harvard's VAXs — more than 50 — by the time he found out about it at about 2:00 a.m. East Coast time. "Bit by bit, I disconnected from the net and rebooted the machines. But it would still ping-pong among the machines on the LAN. It's like if you're sleeping with five people and one has a venereal disease; it doesn't do much good to only treat one. The answer is for everyone to get a shot of penicillin."

Von Neuman Computer Center, New Jersey. Notified at 2 a.m. Thursday, a team of four employees combed through minicomputers that act as front ends to its T1 lines. They brought down the machines, reloaded all the files and, at the same time, "plugged the hole by which the virus entered the one affected machine — a DEC VAX 750," said Jeff Huskamp, vice-president for computing.

TRENDS

Mainframe spreadsheets

Growth in installations is stabilizing, demand diminishing

PERCENT OF SITES*

- [ ] Installed as of January
- [ ] Planned as of January

7.5% 2.6% 8.6% 1.7% 10% 1.1% 11.8% 0.9% 11.7% 0.5%

1984   '85   '86   '87   '88

*Figures for all charts are based on surveys of 12,000 U.S. IBM and plug-compatible mainframe sites

D espite the computing community's wait for Lotus Development Corp.'s 1-2-3/M, a mainframe version of the popular personal computer software, the market for mainframe spreadsheets is stagnant.

The number of IBM and plug-compatible mainframe sites with spreadsheets installed on the host system has leveled off, and the number of mainframe sites planning installations has dropped to an almost negligible level, according to figures compiled by Focus Research Systems, Inc. in West Hartford, Conn.

"The feeling at one time was that [PC and mainframe spreadsheets] would drive each other, but using a spreadsheet on a PC is much better. The PC is really the platform of choice, without a doubt," said Scott Brown, an analyst at Focus Research.

Brown said superior response time on PCs is the single most important factor behind their use. However, data center managers often prefer to keep highly interactive programs such as spreadsheets off the mainframe to save capacity, he said.
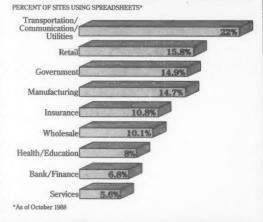
Brown said signs are clear that the market for mainframe spreadsheets will remain the same or shrink in coming years.

Among mainframe spreadsheet packages on the market, Tower Systems' Omnicalc leads in market share with 28%.

Transportation, communications and utility companies are the largest users of mainframe spreadsheets; 22% use the programs.

STANLEY GIBSON

Market penetration by industry

PERCENT OF SITES USING SPREADSHEETS*

Transportation/Communication/Utilities 22%
Retail 15.8%
Government 14.9%
Manufacturing 14.7%
Insurance 10.8%
Wholesale 10.1%
Health/Education 8%
Bank/Finance 6.8%
Services 5.6%

*As of October 1988

Lots of competition for commercial tools

PERCENT MARKET SHARE BY INSTALLED BASE*

14.1% Other
13.8% Computer Associates' Megacalc
14.1% Trax Softworks' ESS
14.6% On-Line Software International's Maxicalc
15.4% Dynasoft's Dynacalc
28% Tower Systems' Omnicalc

*As of October 1988

SOURCE: FOCUS RESEARCH SYSTEMS, INC.

No room at the inn. IBM pegged the 9370 as a Unix processor at the introduction of the AS/400 in June, and last week's Unix Expo gave IBM a golden opportunity to showcase the much-maligned mid-range machine. However, IBM's exhibit, which included nearly everything but the kitchen sink, left out the 9370. The 3090 mainframe, mid-range 4381, RT and PS/2 were all featured in IBM's "Extending the power of Unix" networked display. The 9370 was supposed to be included, according to earlier IBM preshow press releases but, according to IBM, was not because of "lack of space." Apparently, things were a little too tight in the 20,000 square feet that IBM occupied as the largest exhibitor at the show.

How much is it? At Comdex/Fall '88, Ashton-Tate will finally announce some details about SQL Server. The product, scheduled to ship this year but not expected until early next year, will gain an important feature: a price. We hope it's cheap.

SQL and more SQL. End users had better get used to it: They are going to hear a lot more about SQL at Comdex. Oracle will announce — but not ship — its server product for OS/2. Borland will finally show off a version of Paradox that contains SQL and will be able to query SQL Server and IBM's OS/2 Extended Edition. Paradox developers have talking about this capability for about two years.

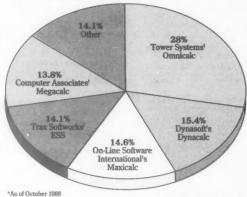**A Big Blue suit?** After Apple filed suit against Microsoft and Hewlett-Packard for allegedly ripping off the Macintosh interface, speculation about the suit's real target ran rampant. Many believed that Apple was after Microsoft and its partner IBM, which were jointly developing the OS/2 Presentation Manager, based largely on Microsoft Windows 2.03, which was named in the Apple suit. Well, Pman has shipped and as of our deadline had not been added to the Apple action. IBM, Microsoft and Apple officials all claim there have been no discussions about Presentation Manager infringement, and Microsoft's Bill Gates said that Presentation Manager was not changed because of the suit. Gates said his firm's relationship with Apple was fine, except for its legal department. Ironically, Apple's counsel also does a healthy business representing IBM and may not be able to represent Apple against the PC giant, a well-placed copyright infringement lawyer said.

A modest proposal . . . When will the current leveraged-buyout mania end? One observer, mocking the $20 billion offer being considered by RJR Nabisco, has written an imaginary $115.2 billion prospectus for none other than IBM. James Grant, editor of an investment newsletter, envisions IBM management taking on $100 billion in debt to finance the $180/share buyout. Then the real fun would begin — massive layoffs and slashing billions from IBM's fabled research and development budget. And investment bankers, lawyers, accountants and the like would pocket $4.89 billion for doing the deal, showing Wall Street at its best.

Blue-collar pitch. With the recent introduction of its Distributed Automation Edition platform, traditional hierarchist IBM has become, of all things, the champion of peer-to-peer computer-integrated manufacturing (CIM). Most current CIM installations have cell controllers coordinating different steps of a manufacturing process by reporting to the plant controller host. But an IBM spokesman at Autofact says that puts too much of a burden on a mid-range system. Much better, he says, to have PS/2-based controllers pass along information without host involvement, using LU6.2. Of course, IBM is not all that strong at the plant-control level — the hosts it wants to get rid of are put out by people like DEC and Hewlett-Packard.

Phew! After last week's Invasion of the Worm that ate the Network, we're kind of glad we never got around to setting up an E-mail box for this column. If you want to digitize with a newspaper, call the Katt. If you want to speak English with a real live news editor, call 800-343-6474 or 508-879-0700 and swap horror stories with Pete Bartolik, who has a team of red-hot humans willing and able to chase down leads.

OUR NEW PRINTERS MAKE EVEN BAD WRITING LOOK GOOD.

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                    CHAPTER ONE

              THE BLACKEST HOUR IS MIDNIGHT


         It was not a night fit for man or beast what with
   the sky being as black as ink and it starting to rain
   like cats and dogs.  As if things weren't bad enough
   Jeffrey Whipple had to climb all the way up to the top
   of Bald Eagle hill in his snakeskin boots so new their
   smell reminded him of a car he once leased in
   Flagstaff, Arizona just to check things out because
   earlier in the day a message had gotten through that
   there was going to be trouble this night so he was
   feeling ominous as the dry wind whipped up the dust
   around his feet and wondering if he should go on or go
   back to camp when suddenly, he heard a twig crack
   behind him or thought he did but as he turned he
   didn't see anything except the black bleakness of the
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